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THE AMERICAN ARCHITECT AND BUILDING NEWS

VOLUME XII

JULY – DECEMBER

1882

JAMES R. OSGOOD & CO. PUBLISHERS.
211 TREMONT ST. BOSTON.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & CO. No. 340.

JULY 1, 1882.

Entered at the Post-Office at Boston as second-class matter.

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NOTES AND CLIPPINGS. 10

A COMMISSION has been appointed by the Governor of New York, consisting of General Quincy A. Gillmore, one of the best living authorities upon many branches of the technology of construction, Mr. George B. Post, a very skilful architect, and Mr. Charles Babcock, Professor of Architecture at Cornell University, to examine the different parts of the new Capitol at Albany, and determine as to its safety. It would be difficult to find three men anywhere better qualified for such a task, and we congratulate Governor Cornell on the excellent judgment which he has shown on this, as on several other occasions, in the selection of expert commissioners. Although we are not inclined to give much credit to the alarming assertions of newspaper correspondents with regard to the great stone vault over the Assembly Chamber, the difficulty of such a construction, particularly in these days, when it is impossible to find workmen experienced in similar matters, is so great that the most scientific architect might hesitate to put implicit confidence in its success, however well it might be designed, and we have been sorry to hear that investigation, instead of being encouraged in every possible way, had been made very difficult, even for those most concerned in knowing the truth, by covering the vault with a thick coating of concrete or cement, which, however advisable in future as a protection against the infiltration of water, might safely have been postponed until the risk of movements taking place undetected beneath it should be past.

THE bill authorizing the construction of the new building for the National Library has been postponed until the next session of Congress, mainly on account of a renewal of the disputes about the site, which we had hoped were happily over. Although the committee having the matter in charge unanimously favor the purchase of land for the building on Capitol Hill, near the Capitol itself, a certain number of members, with what seems to us a very mistaken notion of economy, still urge that Judiciary Square, which already belongs to the Government, should be occupied for the purpose, quite forgetting that the area of government land in Washington being limited, if Judiciary Square is taken for the present purpose it will soon be necessary to buy another plot in place of it, with the very probable consequence that the Library, a structure which is to be nearly, if not quite, as costly as the Capitol itself, will be permanently relegated to an obscure and out-of-the-way region, as Judiciary Square, however central it may be, undoubtedly appears to strangers; while the noble site beside the Capitol will perhaps for want of other room be disfigured with a cheap barrack or office building. To the professional visitor, the magnificence of the opportunity which Washington presents for architectural display already seems only equalled by the astonishing indifference with which the opportunity has been thrown away. With the first great step already taken, in the erection of the Capitol, toward the formation of an Acropolis surpassing in imposing display any collection of buildings in the world, we find now, after the expenditure of hundreds of millions of dollars, the Capitol, except for the fourth-rate tenements which elbow themselves every year nearer, still lonely on its height, while the vast piles of the Treasury, the State, War and Navy Building, the Patent-Office, and the Post-Office, seem to have rushed in terror down the hill and landed in confusion at the bottom, led by the Monument, which has gone farther, and abased itself more, than any of the others, and sticks contentedly out of the mud at the very edge of the water, overlooked by a hill ninety feet high.

Two accidents, neither of them, unfortunately, of a very unusual kind, took place in New York a few days ago. One of them occurred in the Colwell Lead Works, a well-known establishment situated on Centre Street. By some carelessness an immense weight of lead pipe, shot and other heavy goods had been allowed to accumulate on the second floor of one of the buildings belonging to the company, used principally for storage, until the beams, loaded far beyond their strength, gave way all at once, precipitating their burden to the cellar. A workman was packing lead in the first story, immediately beneath the place where the rupture began in the floor above, and hearing the cracking of the timbers sprang toward the door, only a few feet away, but was struck by the falling débris before he could reach it, and instantly killed, his body being found buried under ten tons of metal. The other accident resulted in serious injury to a man and wife, tenants in a house on East Broadway. The former, for the sake of the cool air, went out on the platform of a fire-escape to sleep. In the middle of the night he was waked by feeling the platform give way under him, and called for help, at the same time endeavoring to climb back into the room by the window. His wife ran to assist him, and as she stepped upon the platform her additional weight broke the slight remaining hold which it had on the building, and it gave way, carrying both with it. Instead of falling to the yard, they were thrown upon the roof of a small shed, but both were badly hurt.

A SUIT was recently brought in New York to recover damages for defective plumbing work, which we are sorry to see was unsuccessful. It seems that the plaintiff, a Mr. Scott, desiring some time ago to have a waste-pipe on his premises cleaned out, engaged Mr. Brown, who called himself a plumber, to do the work for him, and the latter deputed two of his employés to take charge of the job. These excellent men proceeded to the house, where they cut a hole in the pipe, cleared it out, and repaired the orifice by sticking on a bit of sheet lead with putty, and tying it with copper wire. Soon afterwards, sickness appeared in Mr. Scott's family. Three of his children died, one after the other, with symptoms which suggested sewer-gas poisoning, and Mr. Brown, fortunately for the public, having abandoned earthly plumbing to seek his eternal reward, he brought suit against his executrix to obtain pecuniary satisfaction for the loss which he had suffered, as he believed through her husband's fault. Although juries can generally be relied upon to show a commendable strictness in holding professed mechanics to a reasonable degree of care and skill in the arts which they practise, there was in this instance a doubt as to the actual cause of the illness which afflicted Mr. Scott's family. Not being himself, apparently, one of the neatest of men, he had allowed great numbers of rats to frequent his cellar, and the drain-pipe was not only found gnawed by them, but many of their bodies, half decomposed, were scattered around it. Under these circumstances there might well be a doubt whether the sewer-gas or the effluvium from the dead rats would be the more pernicious in its effects, and on the well-established principle that a man cannot hold other people responsible for injuries to which his own gross carelessness contributed, it was necessary to discharge the defendant.

THE electric-light companies in New York are preparing for a busy summer. The Edison Company, which expected to have all its wires laid, and incandescent lamps in full operation in at least one of the twenty or more districts into which it has divided the city by last January, now finds that the opening of its business must be deferred until some time next autumn, although great preparations have been made, and much of the necessary electrical machinery is already in place. Among the different forms of apparatus now ready to be set in motion are six enormous dynamo-electric machines, weighing about thirty

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tons apiece, each driven by a steam-engine of one hundred and twenty-five horse-power, and furnishing a current capable of maintaining seventeen hundred and fifty incandescent lamps. Besides the six already mounted, four more machines will be needed to supply the first Edison district alone. The Brush Company is said to have obtained control of the Swan incandescent lamp for the city of New York, and is taking measures to introduce it into general use; while the United States Company also proposes to extend the sale of the Maxim lamps, for which it owns the patent. The Edison Company professes to claim that both the Swan and Maxim lamps are infringements of the Edison patents, so that there seems to be a prospect of indefinite litigation on the subject, unless, indeed, the arbitration committee of the Gramme Company, to which all the respectable electric-light corporations now belong, should succeed in effecting an adjustment. The contest for the control of the Faure storage battery seems to have abated in violence, partly, perhaps, on account of the claim of priority of invention made by Mr. Brush, which, if sustained, would invalidate the Faure patent in the United States.

The *Scientific American* gives an interesting description of the new Eddystone light-house, in England, which has just been formally opened, after having been more than three years in construction. The renown of Smeaton's great work, which had stood for more than a century at the entrance to the Channel, perhaps exceeded its merit, and although it defied the waves to the last, an investigation, undertaken some five years ago, showed that the surface of the ledge on which it stood was so disintegrated as to compromise the safety of the whole structure. The upper portion was an ingenious combination of dovetailed and dowelled blocks of stone, and was apparently uninjured, but nothing could be done to save it so long as the foundation was imperfect, and it was taken down. The new light-house is constructed in a different spot on the reef, and like the old one, is a solid mass of dovetailed and dowelled granite masonry, a grouting of Portland cement adding to the cohesion of the whole. Smeaton's idea of profiling the tower like the trunk of a tree, the shaft rising with a concave curve from an expanded base, has also been followed, but with the difference that the curve, instead of starting from the surface of the ledge, as in the old one, begins only at the top of a cylinder with vertical sides, which rises some feet above high-water mark. The intention of this change was to diminish the tendency of heavy seas to run up the curve toward the top of the light-house, where they exerted a force the more destructive on account of the leverage afforded by the distance from the base. By the cylindrical portion, which is of enormous weight and resistance, it is hoped that the force of the waves will be met and broken, instead of being deflected vertically, and the light superstructure will be spared a portion of the shock.

M. Charnay's discovery of a hitherto unknown ruin in Yucatan turns out to have been of less moment than was at first imagined, although some interesting observations were made. On arriving at what was supposed to be the "Phantom City" mentioned in the account of the journey of Stephens and Catherwood, he found the remains of a Toltec settlement of considerable importance. The great temple of the place, built on the summit of a pyramid a hundred and twenty-five feet high, still stands, and until the decay and fall of the idol, which lies in fragments on the floor, was frequented by the Indians of the neighborhood, who came there to offer incense. A great teocalli, or pyramid, two hundred feet high, stands behind the temple, and exhibits the remains of palaces or other buildings on its top. The sculptures, of which many remain, show the Toltec type already studied at Palenque and other places. Although he found himself forestalled by an amateur English explorer, Mr. Alfred Maudslay, who had reached the ruins before him, M. Charnay, as a professional archæologist, had the honor of naming the town, which he called Lorillard City, after the patron of the expedition. In his opinion, the Phantom City of Stephens yet remains to be discovered, and he is inclined to place it in the state of Chiapas, on the other side of the mountains. The result of his investigations seems to strengthen the apparent relationship between the Toltec or Maya civilization of Mexico and Central America and that of Eastern Asia. There is a Chinese legend of a voyage of one Fuh Siang to the unknown East in the fourth century of our era, and although we are not prepared to receive without hesitation the assertion of one enthusiastic explorer, that the hieroglyphics found on a certain Mexican monument are identical with "old Chinese," there may still be an interesting story of migration to be traced out by future ethnologists.

The great church of St. Sophia in Constantinople is said to be in danger of speedy ruin, partly from the natural decay of its masonry and the long-continued pressure of its enormous domes, and partly from the effect of the misjudged alterations and repairs made by the Italian architect, Fossati, who was employed for many years about the building. During the progress of the works of restoration, which continued from 1847 to 1861, the Sultan Abdul-Medjid, no doubt on the solicitation of Fossati, who was an enthusiast in his way, caused a magnificent monograph upon the structure to be prepared, illustrated with chromo-lithographs in the best style of the time, from water-color drawings made on the spot expressly for the purpose, by Louis Haghe, the rival of Prout as a painter of architectural subjects. This work, published under the title of "Aya Sofia," the Turkish corruption of the Greek name of the church, would become of priceless value in case of the destruction of the famous building from any cause, and it is much to be wished that the same service which the Turkish ruler performed for a monument of a foreign age and religion might be repeated even half as thoroughly and well for some of the great masterpieces of Christian architecture, which the descendants of the original builders are either quietly suffering to pass out of existence, or are improving beyond recognition. It is said that the court dentist of Constantinople is to have charge of the repairs which have become essential to preserve the great mosque even a few years longer. This probably means that he is to disburse the money, employing persons more competent than himself to carry out the actual operations: so that although at first sight the arrangement does not appear particularly well calculated to secure the best technical results, it is by no means certain that interesting and scientific work may not be done.

Our readers will remember the interesting letter written by the Chevalier da Silva, from which we had the pleasure of making some quotations, describing his singular discovery of the remains of the Roman city of Nabactia, near Thomar in Central Portugal. Being in the neighborhood on business, and knowing that the ancient town was situated at or near the spot, he amused himself, while taking a morning walk through the fields, in thrusting his cane at random into the ground. Almost at the first trial the ferrule struck a small, hard substance, which on being thrown out proved to be a fragment of a mosaic pavement, and a slight excavation, made by the laborers who were soon summoned, laid bare the site of what appeared to have been a richly-decorated *exèdre*. Since then systematic explorations have been carried on, and, as we learn from *L'Architecte*, four streets have been cleared of débris, and the remains of sixteen houses laid bare; more mosaics have been found, together with marble shafts and capitals; and there is every reason to suppose that temples and other public buildings will soon be discovered.

It seems from the Boston *Transcript* that the present inhabitants of Mexico are about to be indebted to "Boston enterprise" for the revival of "an ancient Aztec art." According to this authority, "whoever has looked upon specimens of the art and literature of the Aztecs must confess that they were an ingenious people," a proposition which, for several reasons, it would be difficult to controvert; but it appears that "about the only art which has survived the violent rupture of the Indian Empire" is that of feather painting. We had supposed that the renowned silver filigree work of Chihuahua, whose merits were heralded not long ago in a somewhat similar manner, might claim to be included in the list of Mexican arts, but perhaps this is excepted as not being an Aztec invention. However that may be, we are delighted to learn that within a short time the invaluable aid of some Boston tourist has been lent for the improvement of the rude Indian taste in feather work, and now, "acting on the suggestions of Northern visitors," the natives "have surpassed all former efforts in producing combinations and groups of figures of birds in their natural colors, and with all their natural aspects." We long to see some of these Yankee-Aztec productions, and can well believe that a revelation in art awaits us.

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BUILDING SUPERINTENDENCE.—XIX.

PLASTERER.

[*If this is made a separate contract, the full title and the General Conditions should precede the Specification.*]

Verifying Furrings. THE plasterer is to examine and try all ceilings, partitions, and furrings, and is to notify the carpenter of all that are not square, true, plumb and level, and see that they are corrected before lathing, and that all are firm and secure.

Back-Plastering. Back-plaster the whole of exterior walls from sill to plate between the studs, on laths nailed horizontally ⅜″ apart to other laths or vertical strips put on the inside of the boarding, all well trowelled and brought well out on the studs, girts, and plate, making all air-tight.

One-Coat Work. Lath and plaster basement ceiling one heavy coat, well trowelled and smoothed.

Two-Coat Work. Lath and plaster two coats in the best manner all other studdings, underside of stairs, partitions, furrings and ceilings throughout the building, except in rooms marked "Unfinished" on plans, carrying the plaster to the floor everywhere.

Laths. Laths to be best seasoned pine, free from knots, bark or stains, all laid ⅜″ apart, and breaking joint every six courses and over all door and window heads. The first coat of plaster to be of No. 1 Extra [*Rockland*] lime, and clean, sharp sand, well mixed with a half bushel of best long cattle or goat's hair to each cask of lime, thoroughly worked and stacked at least one week before using, in some sheltered place, but not in the cellar of the house; all to be well trowelled, straightened with a straight-edge and made perfectly true, and brought well up to the grounds. The skim coat to be of No. 1 Extra [*Rockland*] lime, slaked at least seven days before using, and washed [*beach*] sand, and well floated.

Cornices. Run moulded cornice, not over 30″ girt, with one enriched member, in parlor, and plain moulded cornices, not over 24″ girt, in dining-room, library, and four chambers in second story, and in first-story hall, carrying two members of the hall cornice up the soffit of stairs to second story and around second story hall: all to be in accordance with detail drawings.

Beams. Form beams where shown, according to detail drawings.

Centres. Plant plaster centres in parlor, dining-room and library, to be 3′ in diameter in parlor, and 2′ 6″ in dining-room and library, all to be made in accordance with detail drawings, and two wax models to be made and approved before casting.

Point up with lime and hair mortar around outside door and window frames; clear away and remove all rubbish from the premises after the second coat of plaster is on; clean the mortar off the floors and sweep out the house and leave all ready for the wood finish; patch up and repair all the plastering at the completion of the building, and leave all perfect.

Whitewash. Whitewash cellar ceiling, walls and piers two coats in the best manner.

CARPENTER.

[*If this is made a separate contract, the full title and the General Conditions should precede the Specification.*]

Scantlings.

Sill, 6″ x 6″, halved and pinned at angles.
Plates, 4″ x 6″.
Posts at angles and opposite partitions, 4″ x 8″.
Girts, 4″ x 8″.
Braces, 4″ x 4″.
Window studs, 3″ x 4″.
Door studs, 4″ x 4″.
All other studding, 2″ x 4″, 16″ on centres.
Partition caps, 3″ x 4″.
Soles, 2″ x 5½″.
Girders, 8″ x 10″.
Sleepers, 6″ x 6″, 8′ apart.
Floor beams, 2″ x 10″, 16″ on centres.
Headers, 4″ x 10″, and 6″ x 10″, according to framing plans.
Trimmers, 4″ x 10″, and 6″ x 10″, according to framing plans.
Rafters, 2″ x 6″, or 2″ x 8″, as marked on framing plans, 20″ on centres.
Deck rafters, 2″ x 8″, 20″ on centres.
Hip and valley rafters, 3″ x 9″, or 3″ x 12″, as marked on framing plans.
Trimmer and header rafters doubled and spiked together.
Ridges, 1″ x 10″.
Piazza and porch girders, 4″ x 10″.
Piazza and porch floor beams, 2″ x 6″, 20″ on centres.
Piazza and porch rafters, 2″ x 6″, 20″ on centres.
Hips and valleys, 3″ x 9″.
Piazza and porch plate, 6″ x 10″.
Piazza and porch posts, 8″ x 8″.

Stock. Sleepers in basement to be of locust. Piazza and porch posts to be of best well-seasoned dry white pine or whitewood. All other framing timber to be good sound spruce, free from large knots, waney pieces, and shakes.

Framing. The house is to be full frame, all framed, braced, and pinned in the best and strongest manner, perfectly true and plumb, and in accordance with the framing drawings. No woodwork is to be placed within one inch of the outside of any chimney, and no nails to be driven into any chimney. The underside of sill and ends of girders are to be painted two heavy coats of oil paint before setting in place. The basement beams to be sized upon the sleepers, which are to rest on the concrete. The beams of first-story floor to be notched down four inches on the sill and mortised two inches more into it, bringing the bottom of the beams flush with the bottom of the sill, and to be framed with tenon and tusk into the girders, flush at top and bottom: all to be well spiked to the sill, and the tenons secured to girders with oak pins. Beams of second and third story floors to be notched down four inches on the girts, and spiked to girts and studs, and sized one inch on partition caps, spiking the beams strongly together wherever possible to form a tie across the building. Headers to be framed into trimmers with double tenon and pinned, and all headers which carry more than three tail-beams to have ⅞″ joint-bolts at each end in addition. Tail-beams to be framed into headers with tenon and tusk and pinned. All floors to be bridged once in every eight feet with a straight, continuous row of double herring-bone cross-bridging of 1″ x 4″ pieces, cut in and nailed with two nails at each end of each piece. Beams under unsupported partitions which run parallel with them to be in pairs, set 7½″ apart on centres.

Bridging.

Piazza and Porch Floor. Piazza and porch floor to be framed with a 4″ x 10″ girder from each post or pier to the house, set so that the top of the girder is 1″ below the top of the sill, and pitching away from the house one inch in every five feet. Each girder to be gained one inch into the whole depth of the sill, and to be secured to the sill with ⅞″ joint-bolt. Into these girders are to be framed the 2″ x 6″ piazza beams, all flush on top.

Piazza and Porch Roof. The finished posts of piazza and porch will stand upon the floor, with tenon 4″ long into the girder, and the plates are to be framed into them and pinned. The rafters are to be notched upon the plate and spiked, and strongly secured to house.

Piazza and Porch Cornice. Form the cornice of porch and piazza as shown on detail drawings, all of pine, with planceer, facia, bed mould, and gutter all around as shown, with leaded joints, two-inch lead goose-necks and [*four*] three-inch [*tin*] conductors where directed, properly supported and entered into the drain-pipes prepared to receive them.

Main Roof. The main roof of the house is to be framed as shown on framing plans. Rafters to be notched on the plate and spiked. Partitions to be carried up to support roof wherever practicable, and all to be thoroughly tied and made perfectly secure and strong.

Main Cornice. Form the main cornice as shown in detail drawings, with 3″ x 4″ gutter all around, facia, and planceer, rebated 1¼″ belt at top of wall, and raking moulding in the angle: all of pine. Gutter to have leaded joints and three-inch lead goose-necks. Put on [*six*] four-inch tin conductors where directed, all strongly secured and properly entered into drain-pipes prepared for them.

Gable Finish. Gable finish to be as shown on detail drawings, all of pine, with 1¼″ rebated piece at top of wall, to show 8″ wide, 1¼″ plain planceer put on under side of projecting roof-boards with ⅞″ furring between and to show 10″ wide, and corona and cymatium moulding 3¾″ wide in all, to cover ends of roof-boards and edge of planceer, and 3″ x 3″ bed-mould in the angle.

Roofing. Cover all the roofs, including those of porch and piazza, with good hemlock boards, planed one side to an even thickness, and well nailed to every rafter, two plies of pine-tarred felt paper, breaking joint, and shingle with first quality 16″ sawed cedar shingles, laid 4½″ to the weather, and nailed with two galvanized nails to each shingle. Form dormers, etc., as shown on drawings. Furnish wide counter-flashings of 4-lb. lead for the mason to build into joints of chimneys, shingle in wide zinc flashings to turn up against the brickwork as high as the counter-flashing will allow; then turn down the counter-flashing, dress close, and cement perfectly tight against the brickwork. Shingle in wide zinc flashings in valleys and around dormers, and put on wide zinc apron to protect junction of piazza and porch roofs and house wall, and warrant all tight for two years from the completion of the building. Make all tight under dormer sills and around dormers.

Scuttle. Make scuttle 2′ x 2′ in roof where directed with rebated frame 4″ high, and cover hung with strong strap hinges, and to have iron bar fastening and fixtures to keep it open at any desired angle. Frame and cover to be tinned and all warranted tight.

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Enclose the walls with good hemlock boards planed one side to an even thickness, and two thicknesses of good felt-paper breaking joint. Shingle the whole of the walls above belt at second-story floor level with first quality 16″, sawed cedar shingles, laid 6″ to the weather and nailed with two common nails to each shingle. Where the shingles come against door or window casings nail only at the side next the casing, with two nails. Under window sills and elsewhere where exposed the nails to be galvanized. Shingles in gables to be laid alternately long and short, without selecting for uniform width, the difference in length to be 1½″. Cut shingles, of uniform width and to pattern as per drawings, to be used in panels where shown on elevations.

Walls. **Cut Shingles.**

All other portions of the wall to be covered with sap-extra pine clapboards, all laid to a perfectly even gauge of not over 4½″, and all nailed to every stud with galvanized nails, set in for puttying.

Clapboards.

Put strips of zinc 3″ wide around all window and door casings throughout, running under casings and clapboards or shingles.

Zinc.

Form the belt at second-story floor level according to detail drawings by putting on furrings over each stud on top of the under boarding and putting a second boarding outside, brought to a feather edge at the top. The lowest of these boards to be planed on the edges and the shingles to be brought down over. Finish under the edge with a 2¾″ bead. Under the moulding will be a belt 1¼″ thick and to show 6″, with the bottom edge rebated.

Make also belt at level of window-sills where shown, of a 2½″ cove and fillet moulding, bevelled on top to correspond with the pitch of the window-sills, and put on over the shingles, which are to be gauged to correspond. Form the front edge of these window-sills so as to continue the moulding without any break.

Belts.

Form the base as shown on detail drawings, on sides next to piazza and porch to be 1¼″ thick, rebated on top, and to show 6″ high above piazza floor, with small bevel, stopping against half-posts of the balustrade, scribed against the wall. In other places the base will be formed by 1¼″ feather-edged piece standing out from the wall, the clapboards to be brought down over it, and a 1¾″ bead to run underneath. All of good, seasoned white pine.

Base.

There will be corner-boards only in first story where clapboarded, shingles being in all cases brought out to the angles. All corner-boards, door and window casings to be 1¼″ thick, and of widths as marked on drawings, all of good, seasoned pine, and the top edge rebated.

Casings and Corner-boards.

The porch will stand on 12″ x 12″ brick piers to be built by the mason. Piazza to stand on red cedar posts, 4′ in the ground, furnished and set, exclusive of excavation and refilling, by the carpenter. Floors to be framed as described above, and to be covered with ⅞″ rift hard-pine boards, not matched, laid close joint and well nailed and the outer edges rounded. Finish under edge of floor with a planed board 10″ wide, case the posts in front with planed boards, and fill in between them, and between piers under porch, with jig-sawed work of ⅞″ pine boards down to the ground, finishing with board, and with mouldings broken around to form panels, all as shown on drawings.

Complete the porch and piazza as per detail drawings, the balustrades, braces, turned, carved and ornamental work to be all of good seasoned white pine; and ceil the underside of roofs, and of all projections of oriels, balconies, etc., with ⅞″ matched and beaded spruce sheathing not over 4″ wide, on furring strips 12″ on centres, formed into panels by ⅞″ x 4″ bevelled strips, planted on. Case over the plate with ⅞″ pine with ¾″ bead on each edge, and finish the junction of piazza ceiling and main wall with 2″ cove moulding neatly stopped.

Piazza and Porch.

All outside steps except the granite lower step at front entrance to have ⅞″ pine risers and 1¼″ rift hard-pine treads with rounded nosings returned at the ends; all to be supported on 2″ x 12″ spruce strings 12″ on centres, the outer strings to be planed or cased, and the foot of the strings to be notched upon the granite step or upon a 4″ x 4″ piece supported by two red cedar posts 4″ in the ground. Enclose under ends with vertical ⅞″ pine strips, jig-sawed as shown on drawings, with bevelled base.

Outside Steps.

Make bulkhead entrance to cellar, with plank steps on plank strings, all planed, and cover of 4″ matched pine boards, battened, hung with heavy strap hinges bolted on, in strong plank frame, and all made tight, and furnished with strong bar fastening.

Bulkhead.

All other outside finish is to be of good, thoroughly seasoned white pine in strict accordance with elevations and detail drawings, and all leaded where necessary to make it weather-tight. Project beams for bays, oriels, etc., and do all furring and other work for completing the whole in the best and strongest manner.

Other Outside Finish.

The carpenter must call upon the painter to prime all exterior finish before putting up or immediately afterwards, and is to replace all work warped or cracked.

Priming.

The Hall, Laundry and Water-Closet in Basement will have single floor of first quality ⅞″ rift hard pine, square joint, not over 6″ wide. All other floors throughout the building are to be double, the under floor to be of good hemlock boards, planed one side to an even thickness, well nailed, and two plies of good felt-paper to be laid between all upper and under floors. Under flooring in Hall, Parlor and Bath-room to be not over 3″ wide; in Kitchen, not over 6″ wide; elsewhere to be any width.

Inside Flooring.

The Kitchen, Back Vestibule, Storeroom and Butler's Pantry on first story, and Back Hall in first, second and third stories to have upper floor of first quality rift hard pine, not over 6″ wide, matched and blind-nailed. The main Hall on first story to have upper floor of first quality selected quartered ⅞″ oak, 2½″ wide, matched, laid in herring-bone pattern, as per detail drawing, and blind-nailed. The Parlor is to have upper floor of ⅞″ second quality white pine, not over 6″ wide, matched, but not blind-nailed, with border of [*Dill's*] parquetry, 20″ wide, in maple and cherry, of pattern No. [*twenty-six*] all laid in the best manner and warranted not to shrink. The Bath-room in second story is to have upper floor of alternate strips of maple and black walnut, not over 4″ wide, matched and blind-nailed.

Upper Floors.

All other rooms and closets throughout the building to have upper floor of ⅞″ second quality pine, matched but not blind-nailed, not over 6″ wide in first story and second story chambers; not over 9″ wide elsewhere. Make mitred borders to all hearths, registers, and staircase openings.

All under floors to be thoroughly repaired and cleaned before upper floors are laid.

All hard-wood flooring to be of the very best selected perfectly seasoned stock, and all upper floors to be kiln-dried, laid breaking joint in every course, well strained and nailed to every beam with twelve-pennies, and all neatly smoothed off by hand and scrubbed out at the completion of the building.

Put on grounds for ⅞″ plastering in first story and ¾″ elsewhere, and put on all angle-beads. Cross-fur all ceilings, including basement ceiling, with 1″ x 2″ strips, 12″ on centres. Cross-fur rafters in finished attic rooms diagonally, with strips 12″ on centres; fur out attic outside walls with studding to give 4′ vertical height, and fur down attic ceiling to 9′ clear height. Set the grounds for vertical sheathing 4′ high in Laundry, Kitchen and Bath-room; for panelled wainscot 3′ high in first and second story Hall and Vestibule, and stairs from first to second story, and for bases elsewhere of heights as specified.

Grounds and Furring.

Fur chimney-breasts with 2″ x 4″ studding set flatways, to be everywhere 1″ clear away from the brickwork; and fur outside stone walls of Laundry in basement with 2″ x 4″ studs set flatways. Fur for beams, arches, etc., as required. All furrings, grounds and angle-beads to be perfectly strong, true and plumb.

Set all partitions with 2″ x 4″ studs 16″ on centres, try with a straight-edge, and straighten and bridge before plastering. All partitions except those that stand over each other to stand on a 2″ x 5½″ piece, and all partitions to have 3″ x 4″ cap. Where a partition stands over another, the studs of the upper partition must stand on the cap of the partition below — not on the floor nor on the beams. Truss over all opening in partitions which extend through more than one story, or carry beams; and strongly truss all partitions not supported from below, to take the weight off the middle of the beams.

Partitions.

Bridge all partitions in first and second stories with two rows of angular bridging of 2″ x 4″ pieces cut in and nailed with two nails at each end of each piece. Reverse the direction of the bridging pieces in each row. Line the pockets for sliding doors with planed boards.

Bridging.

Fill in with saw-dust or planing-mill chips between beams around all water-supply pipes which run in the floors, making all tight.

Saw-dust Filling.

INTERIOR FINISH.

All the stock for interior finish of every kind is to be of the very best quality, thoroughly seasoned and of selected grain, and well smoothed, sand-papered and kiln-dried before putting up. Ash to be best Indiana calico figure, and whitewood to be free from white sap. The Laundry, Kitchen, and Back Halls throughout, including back stairs, are to be finished in hard pine, excepting doors, which are to be of whitewood; the Front Hall and Vestibule in first story to be finished in quartered oak, except stairs to second story, which are to be cherry. The Parlor is to be finished in maple and the Dining-room in ash. The Bath-room in second story is to be finished in black walnut and maple. All other rooms and closets in first and second stories to be finished in whitewood. The hall and large front room in attic are to be finished in

Stock.

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white pine for varnishing. All other rooms and closets in attic are to be finished in pine to paint.

Framed Partitions. Make panelled partitions under front stairs as per detail drawings, the framing to be 1⅛″ thick, moulded, with raised panel ⅞″ thick, all bead and flush on back, all of quartered oak.

Wainscot. Front Hall and Vestibule in first story, stairs from first to second story, and second-story hall, to have panelled wainscot 3′ high, according to detail drawings, with framing ⅞″ thick, moulded, and raised panels ¾″ thick, and moulded cap, but no base. To be of quartered oak in first-story Hall, cherry on stairs, and whitewood in second story.

Sheathing. The Laundry in basement and Kitchen in first story are to be sheathed 4′ high with ⅞″ matched and beaded vertical strips of hard pine, not over 4″ wide, without base, but with neat bevelled cap. The Bath-room in second story is to have ⅞″ matched and beaded vertical sheathing, 4′ high, of alternate strips of black walnut and maple, 4″ wide, with neat bevelled cap of black walnut and ⅝″ bevelled black-walnut base, 4″ high. Plough the sheathing into cap of bath-tub.

Bases. The Parlor and Dining-room are to have moulded base, ⅞″ x 10″, according to detail drawings, to be of maple in Parlor, and ash in Dining-room. All second-story rooms except Bath-room to have ⅞″ x 10″ bevelled base of whitewood. All other rooms and closets to have ⅞″ x 8″ plain board base, of hard pine in Back Halls and Back Stairs throughout; whitewood in remaining parts of basement, first and second stories; pine to varnish in attic hall and large front room, and pine to paint in other rooms and closets in attic.

Plough all bases together at the angles and put them on before the upper floor is laid, and allow ½″ extra below top of floor.

Architraves. All doors and windows in first-story Hall and Vestibule, Parlor and Dining-room, and Hall and all chambers in second story, to have 1⅛″x 4″ architraves, moulded as per detail drawings. To be of quartered oak in Hall, maple in Parlor, ash in Dining-room, and whitewood in second-story hall and chambers. All other doors and windows to have ⅞″ x 4″ plain square board architraves, of black walnut in Bath-room, and elsewhere of wood to correspond with finish of room.

Plinth-blocks and Corner-blocks. The architraves of doors and windows in Parlor, Hall and Dining-room will have corner blocks with carved rosettes according to detail drawings; all others to be mitred. All moulded door-architraves throughout will have plain plinth-blocks. Architraves in Parlor, first-story Hall, and Vestibule to be carried to floor; elsewhere to be cut 5/16″ short, to allow for carpet.

Stool-caps. All stool-caps to be ⅞″ thick, with round edges, of wood to correspond with the finish of the several rooms; and in rooms with moulded finish to have moulding and be according to detail drawings; elsewhere to have bevelled board 4″ wide under.

Brad all architraves, bases and other moulded work in the quirks of the mouldings, and set in all finish-nails for puttying. No splicing of any architrave will be allowed, and joints of bases must be carefully matched.

Doors. Front and kitchen outside doors to be made of pine according to detail drawings, the front door to be 2¼″ thick, moulded both sides, with panels raised and carved outside only as shown; the kitchen door to be 2″ thick, moulded both sides, with plain panels raised one side only.

Inside Doors. All doors in first-story Hall, Parlor and Dining-room, including each leaf of double doors, to be 1¾″ thick, 8′ high, 8-panelled according to detail drawings, with flush mouldings and raised panels both sides. All to have thoroughly seasoned pine cores, veneered with quartered oak in Hall and Vestibule; maple in Parlor and ash in Dining-room. Doors opening between rooms finished in hard wood are to be veneered to correspond with the rooms; but doors opening from rooms finished in hard wood into closets or inferior rooms are to be veneered both sides with the hard wood. Doors from Hall to Vestibule to be similar to other doors in Hall except that the four upper panels are to be filled with stained glass in lead work, to be selected by the owner, but paid for and set by the carpenter, and to cost $2.00 per square foot. All other inside doors throughout the house to be 1⅜″ thick, of solid whitewood. To be 7′ 6″ high throughout second story, 7′ high in Attic, Kitchen and Basement. Second-story doors to be 5-panelled according to detail drawings, with flush mouldings and raised bevelled panels both sides. Attic, Kitchen and Basement doors, except sash-doors, to be 4-panelled square with raised panels both sides.

Sash doors. The door from Laundry to Basement hall-way will have sash in upper part, in 6 lights, glazed with best ⅛″ ribbed plate-glass; the glass and glazing to be furnished by the carpenter.

Door Frames. All doors to have 1¾″ rebated and beaded frames of wood to correspond with the finish of the room, and all to have 5″ hard-pine thresholds. Veneer frames where necessary to show different wood on each side. Sliding doors between Parlor and Hall to have astragal and hollow on the meeting-styles. Double front outside doors to meet with the ordinary bevel, but to have half of a turned colonnette planted on one leaf to protect the joint. Vestibule doors and double doors between Dining-room and Hall to meet with ordinary bevel and moulding over joint.

Windows. The carpenter is to furnish all window frames and sashes, and is to deliver the sashes and sash doors, excepting those which he is himself to furnish ready glazed, to the contractor for painting and glazing, and bring them back to the building when completed; and is also to deliver all frames for cellar windows and doors when required by the mason for building into the walls.

Cellar Windows. All windows in Basement except in Laundry are to have 1¾″ rebated pine frames and 2¾″ sills, and 1½″ pine sashes hinged at the top, with galvanized hooks and staples to keep them open, and strong japanned iron button fastenings; and to have heavy galvanized wire netting with ⅛″ mesh nailed securely on outside of frame. Make frame only for cold-air box openings, covered with galvanized netting in the same manner.

Fixed Sashes. The small windows in Laundry Closet in Basement and in Coat-closet, Pantry, and China-closet in first story, are to have rebated plank frames and 1½″ pine sashes, screwed in tight.

Double Hung Windows. All other windows throughout the building are to have boxed frames with pockets, 2″ sills pitching 1½″, and ploughed for shingles or clapboards as required, all of pine except beads and pulley-styles, which are to be of hard pine; and 1½″ clear pine sashes in lights as shown, with moulded sash-bars and counter-checked meeting rails, all to be double hung with best steel-axle capped brass-faced pulleys, and best shoe-thread sash-line and best iron weights, and well balanced.

Inside beads to be of hard pine throughout, and all put on with round-headed blued screws. Frames in rooms finished with hard wood to have a strip of corresponding wood veneered on the inner edge of the frame.

Dresser. Make and put up dresser in Kitchen as per drawings, all of hard pine. To be 5′ wide and 8′ high, including neat cornice, with two cupboards under with shelf in each, and four shelves above, enclosed by ⅞″ sash doors to slide past each other on metal tracks, with sheaves complete; all to be furnished ready glazed with first quality sheet-glass by the carpenter and fitted up in perfect order.

China-Closet. Fit up the China-closet, as shown on drawings or as directed by the owner, with stand for sink and cupboard under, and four drawers each side, large cupboard with two shelves; six glass shelves 6″ wide on one side, with open fronts, but to have brackets and neat fancy turned standards; and five shelves on the other side, 14″ wide and enclosed with ⅞″ sash doors in front to slide past each other on metal tracks, all to be furnished glazed with first quality glass and fitted up with sheaves complete by the carpenter. All the work in China-closet to be of white wood. Fit up slide in partition with porcelain pull to run sideways.

Pantry. Fit up Pantry with three barrel-cupboards, with neat panelled doors and lifting covers, one case of three drawers, and four shelves running all around. All of whitewood.

Coat Closet. Fit up Coat-closet in whitewood, with one case of four drawers, a shoe rack with eight compartments, each 8″ square, and two rows of hooks.

Bath-Room. Make stand for wash-bowl in Bath-room, with cupboard under, and panelled door, and four drawers each side, all of black walnut. Case the bath-tub with black walnut in one long panel on each exposed side with cap of the same. Case the cistern in the same way, finishing the angles with a neat quarter-round. Fit up water-closet with seat, 8″ bevelled wall-strips and flap only, strongly supported, both seat and flap to be hung with nickel-plated brass hinges and screws: all to be of black walnut. Put black-walnut strip and hooks on one side of the room only.

Basement Water-Closet. Basement water-closet to be fitted with whitewood in the same manner above specified for the one in bath-room, and cistern to be cased with whitewood panelling. Put whitewood lining all around above seat, 15″ high.

Other Wash-bowls. Make stands for other wash-bowls shown on plans as above specified for the one in bath-room, but all to be of whitewood instead of black walnut.

Other Closets. Fit up all closets not specially described above as marked on plans or as directed by the owner. All closets in second story more than 18″ deep, and two closets in attic,

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are to have, unless otherwise indicated, a case of three drawers, with three shelves over, and two rows of hooks. The remaining closets to have two rows of hooks, and one shelf above. All drawers to have neat panelled or moulded fronts, and to run on hard-wood centre strips.

Tank. Make tank in attic where directed, 4′ long, 2′ wide, and 4′ deep inside, of 1¾″ planed pine plank, with splined joints, to be lined by the plumber. Make cover to the same of matched and beaded pine sheathing, battened on the under side, with rounded edges, and hasp and padlock fastening.

Kitchen Sink, etc. Make strong frame to support soapstone sink in Kitchen and wash-trays in Laundry, with 2¾″ ornamental turned legs, and put grooved draining-shelf over sink, all of whitewood. Put beaded strips of hard pine on walls and ceilings of Kitchen and Laundry, and black walnut in Bath-room, for pipes to run on, and case over such pipes as may be directed with neat casings of wood suited to the rooms, screwed on with brass screws.

Blinds. Provide and hang first quality 1½″ outside blinds to all windows, divided and hinged with care so as to fold back neatly and without interfering. All to have rolling slats in the lower half only. Divided blinds, and those of fixed windows, to be hung with wrought-iron L-hinges; all others to be fitted complete with patent Automatic blind-awning fixtures, and all to have Washburn's patent ring fasts, except those for fixed windows, which are to have Shedd's patent wire fasts, so that they can be opened from the outside.

Mosquito Nets. Furnish mosquito guards to all outside doors and windows. Those for the windows to slide outside the sashes on beads put up for the purpose. Those for the doors to be hung on the outside, with springs to keep them closed, and brass hook and staple fastening. All to be made in the best manner with frames of clear seasoned pine, ¾″ thick, covered with suitable wire netting, and all to be stained, varnished, fitted, and marked complete by the carpenter, and neatly stored in a convenient place in the attic.

Outside Windows. Furnish outside sashes to all exterior windows, to be of clear seasoned pine, 1½″ thick, glazed with first quality double-thick glass, in lights to correspond with inner sash, packed with listing around the edges, and arranged to be secured by round-headed screws from the inside to small permanent brass plates set in flush with the outside of the casing and firmly screwed to it. Six plates and screws are to be provided for each window, and for convenience in fixing projecting screws are to be set in the outside sash, by which it can be hung from the edge of the upper plates while the other screws are adjusted. All to be made in the best manner, glazed, painted three coats, fitted and marked complete by the carpenter, and safely stored in a convenient place in basement.

Setting Mantels. The carpenter is to set all mantels in the best manner, and case over for protection until the house is delivered, removing the casing only for painters' work, and replacing afterwards.

Mantels. The carpenter is to make mantels to all fireplaces, and also shelves with brackets in chambers which have no fireplaces, in the best manner, in strict accordance with detail drawings and the directions accompanying them. To be of first quality thoroughly seasoned stock to match the finish of the rooms, and all well bolted and dowelled together.

Step-Ladder. Make strong step-ladder of planed spruce to scuttle in roof: to be movable.

Shelves. Fit up shelf along one side of Laundry and Kitchen, 4½ feet above floor, strongly supported, and put one row of hooks on beaded strip under the same. Put up also neat roller for towel in Kitchen, and hook strip over sink, and put 20 feet run of shelving in furnace-cellar in the most suitable place, and three shelves for batteries and gas-meter where directed by the electrician, bell-hanger, and gas-fitter.

Ash and Garbage Boxes. Make in a suitable place a strong double box of 1¼″ matched and beaded pine, to contain ash and garbage barrels, with division between. Each part to have battened door in front, with good lock and two keys, for removing barrels, and lifting cover on top, hung with brass butts, and with brass hook and staple fastening.

Base Knobs. Put base-knobs with inserted rubber to all doors, of wood to match finish of room.

Flap Tables. Fit up strong flap-table in Kitchen and one in Laundry, of pine.

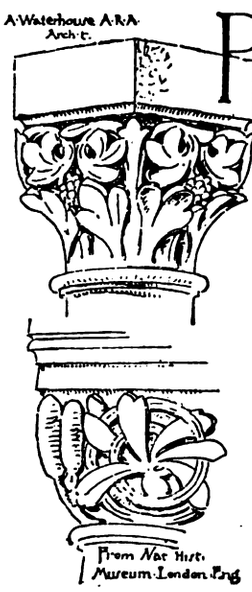
Coal-Bins. Make two good coal-bins in cellar as directed, to hold ten tons each.

Temporary Privy. Build temporary privy for the workmen, to be cleared away and the place cleaned out, filled up, and graded over at the completion of the house.

Cut the floors for registers and hearths as may be requisite, and fit borders neatly around, and cut as required for plumbers, gas-fitters, and other workmen, repairing neatly afterwards. Assist other workmen employed in the building, furnish centres, patterns for bays, lintels, and rough furring as much as may be needed.

Miscellaneous.

TESTS OF WOODEN POSTS.



PROFESSOR Gaetano Lanza of the Massachusetts Institute of Technology read before the Society of Arts, May 17, a paper on the tests made by him with the government testing-machine at Watertown, on the strength of wooden posts, which has been reported in the Boston *Transcript* as follows:—

Last December I had the pleasure of presenting to the society an account of some tests of the strength of full-sized wooden mill-columns, made under my direction for the Boston Manufacturers' Mutual Fire Insurance Company on the government testing-machine at the Watertown Arsenal. Since that time an opportunity has presented itself for testing some old columns, and Mr. Atkinson having authorized me to spend a little more money, but not at all enough to make any one of the investigations complete, I have used it to obtain a few more facts which contain, as I believe, a number of useful suggestions.

The old columns were all of oak, and came from three different mills, which I shall call mills No. 1, 2 and 3, No. 2 being the Pacific Mills at Lawrence.

The posts that were received from mill No. 1 were seven in number, had been in service about six and one-half years, and were removed because they were deemed unsuitable. They were all about 12 feet long, about 6¾ inches in diameter at the larger end, and 5¾ to 6 inches at the smaller end. They were all bored, and the boring was excellent. The load they had sustained was estimated by one of the gentlemen connected with the mill at about 10,600 lbs. per column, beside the weight of snow in winter. They were provided at the top with a maple cap surmounted by an oak base on which rested the next column above, or the roof timbers.

Of these columns three were tested between the platforms of the machine, the ends being brought to an even bearing. These broke under loads giving a breaking strength per square inch of cross section (= total load divided by area of smallest section) of 4,602, 6,032, and 4,682 lbs. The remainder had the maple cap at one end and the oak base at the other, these resting against the platforms of the machine, and the ends not being specially brought to an even bearing. These broke under loads giving a breaking strength per square inch of 2,943, 3,263, 4,223 and 3,450 pounds. The details of appearance of the various columns and their deflections under the loads used were given, and reference made to charts hung around the room. Sections of the columns showing the fractures were shown and described.

It is to be observed that in only one case does the crushing strength per square inch reach 6,000 pounds, and also that in the case of the last four, when the maple caps and oak bases were used, and the ends were not squared up, the strength averages less than in the first three.

The ten columns from mill 2 were taken from the worsted department of the Pacific Mills at Lawrence, where some alterations were being made. Columns A, B, C, D, E, and F were from the first floor of the mill, and the remaining four, G, H, I and J were from the second story. All were about 14 feet long, the first six having a diameter of 10½ inches, the last four of 9½ inches. A, B and C were tested directly between the platforms of the machine, without having the ends specially squared. They broke at 4,265, 3,880, and 4,984 pounds per square inch respectively. D was similarly tested, but had ends squared up, and broke at 4,604 pounds per square inch. E and F were tested with an iron base-plate at one end, and iron cap and pintle at the other, an arrangement the same as that used at the mill. They gave way under 4,662 and 4,838 pounds respectively. Of these posts A was not straight, B had a winding grain, C was quite knotty and appeared shaky near the failure; D, E and F appeared tolerably free from defects.

The posts G, H and I were tested directly and without special squaring of ends between the platforms of the machine, and broke under 4,881, 3,433, and 3,981 pounds per square inch respectively. J was tested with pintle in the same way as E and F. It yielded under 3,266 pounds per square inch. These four posts appeared quite defective, owing to knots, bending, etc. All the posts from the Pacific Mills had been in use twenty-five years, and, assuming fifty pounds per square foot as the weight on the roof, and sixty pounds per square foot as the weight on the floor, there would have been a load on each of the first six of 46,400 pounds to 53,650

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 5.] SATURDAY, JULY 1, 1882.

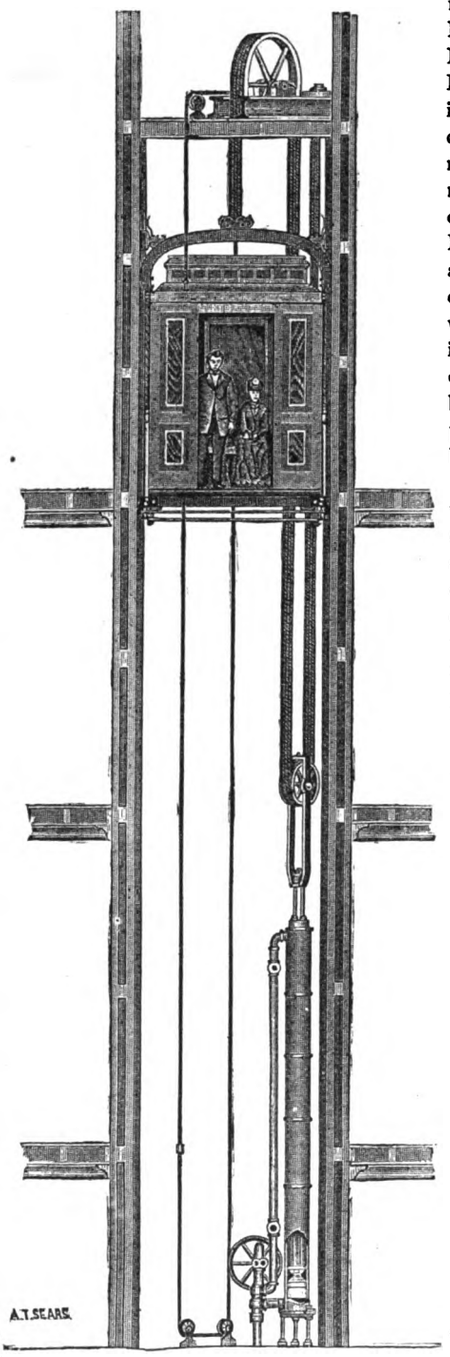
OTIS ELEVATORS.

An experience of twenty-five years exclusively devoted to the manufacture of the various styles of elevators, and hoisting machinery, and to the study of that branch of mechanics, has given us opportunities to judge of the merits of the various hoisting devices employed, and has made us fully acquainted with all the requirements of those using elevators for any purpose. Our success in meeting these requirements during all these years has been uniform and complete, and so well known that special proof of it need not be here presented. The proof may be found in hotels, warehouses, stores, mills, factories, blast-furnaces, iron-works, etc., all over the country. Our experience had accustomed us to a certain uniformity of demand, and a regular rate of production, which regular rate continued until the introduction a few years since of the Standard Hydraulic Elevators. This elevator was adopted by us (and the patents purchased) after a careful and exhaustive investigation (aided by all of our acquired knowledge and experience) had convinced us that for passenger machines it was incomparably the best elevator ever invented or made.

Its success, and the rapidity with which it has been adopted have been unprecedented, and in striking contrast to the old, comparatively slow rate of demand and production. Its claim to be the best has been subjected to the most rigid examination in hundreds of instances, and in every instance the claim has been sustained. These examinations have been made by engineers, architects, and mechanics generally.

A notable instance of such thorough examination occurred when the United States Government invited bids for the elevators in the Custom-House, at Chicago. As Chicago is in the territory managed by our Associates, Messrs. W. E. Hale & Co., the bid for the Standard Hydraulic Elevators was submitted by these gentlemen. The Government, desiring to know definitely which elevator was best, appointed a Board of Experts to examine and report. The result of the examination of the several bids, and of their report, was the acceptance of our bid, and the execution of the work. A further result has been that we have furnished a large number of elevators required by the Government, including the substitution of the Standard Hydraulic Elevator in the New York Post-Office, for the old telescopic hydraulic elevators, which were the occasion of so much trouble and expense.

The superiority of the Standard Hydraulic Elevator over any and every form of steam-elevator, has been shown to be so great, that



we have not sold, or been asked to sell more than two or three steam passenger-elevators in the past three years. This superiority is shown in many points, especially in greatly increased speed, greater smoothness of motion, and low cost of running. Every passenger riding on the elevators in the United Bank Building, Boreel Building, Morse Building, Post Building, (Hanover Street), Liverpool & London & Globe Insurance Company's Building, and many more will testify as to the truth of this statement, relating to speed and smoothness, and the owners will bear pleasant testimony to the low cost of running. The amount of coal used in the Morse Building, Boreel Building, and the other buildings mentioned above, is not more than two-thirds, and in many cases not more than one-half the quantity which would be used by the best steam-elevators doing the same amount of work, to say nothing of quality. The importance of this remarkable fact will be easily seen by those who are paying for the coal used by steam-elevators, by whomsoever made.

It should be explained here that in places where power can not be obtained by connection with the street mains, because the pressure is unreliable, or because too much is charged for the water, it is obtained among other ways by the use of a pump which forces water to a tank placed on the roof, and the fall from the tank supplies the required power. If the work be large a steam-pump is used.

Correspondence is respectfully invited with those wishing further information. Any desired information will be gladly furnished to those desiring it, and copies of the report of the Board of Experts referred to above will be sent.

OTIS BROTHERS & CO.,
348 Broadway, New York.

Works at Yonkers, New York.

RENDLE'S PATENT SYSTEMS OF GLAZING WITHOUT PUTTY.

These systems have now been in practical use in the United States for more than a year, and have scored a decided success. Several railway companies have adopted the systems for depot skylights, etc., amongst which are the New York Central and Hudson River Railroad (which was the first to introduce the systems in this country, for its new Buffalo depot, viz.: a skylight 30′ x 460′), Chicago, Burlington & Quincy Railroad, New York, Pennsylvania & Ohio Railroad, Flint and Pere Marquette Railroad, etc.

A large number of manufacturing concerns have adopted the systems for top lighting, as

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follows: Yale Lock Manufacturing Company, Stamford, Conn., fifty-two skylights, 3′ x 4′; Renfrew Manufacturing Company, Adams, Mass., one hundred and thirty-two skylights, 4′ 6″ x 12′, for their new weaving factory; Barnaby Manufacturing Company, Fall River, Mass., continuous skylight, 20′ x 220′, for their new weaving factory; Hamilton Web Company, Wickford, R. I., continuous skylight, 12′ x 150′; Messrs. Poole & Hunt, of Baltimore, Md., the well-known manufacturers of mill gearing, continuous skylight, using nearly 5,000 square feet of glass; Messrs. Wm. Skinner & Sons' Silk Mills, Holyoke, Mass., skylight, 6′ x 45′; Messrs. S. A. Greene & Sons, Clyde Bleachery and Print Works, Riverpoint, R. I., skylights, 6′ x 32′; Straight Line Engine Company, Syracuse, N. Y.; the Washburn & Moen Manufacturing Company, Worcester, Mass., six large skylights; the Holly Manufacturing Company, Lockport, N. Y., skylight, 12′ x 100′; Messrs. Walcott & Campbell, New York Mills, N. Y., seven skylights; N. W. Gardner, Esq., architect, Buffalo, nine skylights; Miami Soap and Oil Works, Cincinnati, O.; Messrs. Weaver & Seligman, East Saginaw, Mich.; Lawn Tennis Association, New York, twelve large skylights, 9′ x 10′, etc., etc.

The systems are especially adapted for roofs of conservatories, plant-houses, etc., and it is expected that they will very soon supersede the old unsatisfactory method of putty glazing. In England more than five hundred conservatories, etc., have been glazed on Rendle's systems, and experience by work done in this country for more than a year shows that they are as well adapted for this climate as in England.

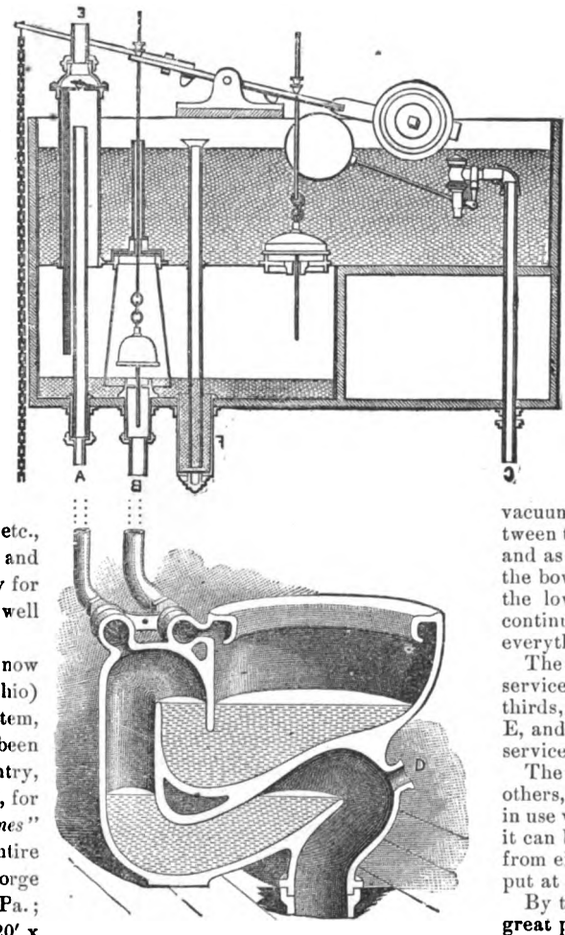
A large conservatory, 150 feet long, is now in process of erection for the Columbus (Ohio) Asylum for the Insane, under this system, and conservatories, etc., have already been erected in different parts of the country, amongst which is a conservatory, 20′ x 50′, for W. B. Storey, Esq., proprietor of the "*Times*" newspaper, Chicago, which has given entire satisfaction; conservatory, 20′ x 100′, George Westinghouse, Jr., Esq., Pittsburgh, Pa.; Mrs. Robert Pitcairn, Pittsburgh, Pa., 20′ x 55′; Napoleon Hill, Esq., Memphis, Tenn.; Messrs. Muschowitz Bros., corner Fifth Avenue and Thirty-first Street, New York, etc., etc.

The systems have taken first premium at Cincinnati Exposition; Boston, Massachusetts Charitable Mechanic Association, silver medal; Pittsburgh, bronze medal. In addition to these, three medals have been awarded in England, and one in Paris.

Some of the largest railway stations in the world have been glazed on Rendle's system, for instance, the Carlisle Citadel Station, 322,000 square feet of glass; Gordon Street Station, Glasgow, 130,000 feet; Bridge Street Station, Glasgow, 100,000 feet; Dundee Station, 100,000 feet, etc.; etc.

Architects and others can send for the new illustrated catalogue containing 40 cuts and 44 pages. Sent free on application.

ARTHUR E. RENDLE,
Rendle's Horticultural and Skylight Works,
7 Warren Street, New York.



A. ¾ inch air-pipe. D. Vent.
B. 1½ flushing-pipe. E. Coupling for air-pipe.
C. Supply-pipe. F. Overflow.

TIDAL WAVE WATER-CLOSET.

This closet is made of one piece of earthenware, and its construction is entirely new in principle, dispensing with all mechanical working parts, as plugs, soil-valves, floats and float-chamber; it is free of putty and cement-joints.

A glance at the sectional view, illustrated above, will show that a large body of water is retained in the bowl by a trap of unusual dip which cannot be reduced under any circumstances, while a second trap, directly under the bowl, in connection with the vent at D, forms an additional safeguard against sewer-gas and renders the closet perfect in a sanitary point of view.

The closet is supplied from a water waste-preventing cistern of the usual construction, and can be operated by lever and chain attached to the closet seat, or by a bell-pull, or by an ordinary closet-pull.

The seat-attachment is preferable for the reason that the operation becomes strictly automatic, and is thus specially adapted for the use of children and persons too thoughtless to make use of mechanical devices.

We adopt the seat-attachment in explaining the operation.

The section shows the closet at rest. When the seat is depressed the position of the valves in the cistern are changed, and the service-box fills, the water expelling the air from the service-box into an air-flue connected at E (top of tank). Relieving the seat rechanges the position of the valves, closing the supply, and opening the outlet valve to the flushing-pipe B. The water rushing down to the flushing-rim of the bowl, creates a partial vacuum in the service-box, causing the air between the two traps and air-pipe A to rarefy, and as a natural consequence the contents of the bowl are instantaneously discharged into the lower trap, starting at the same time a continuous four-inch siphon, which carries everything with it into the soil-pipe.

The vacuum is broken after the water in the service-box has run off to the extent of two-thirds, when air is admitted from the air-flue at E, and the remaining portion of water in the service-box is reserved to refill the bowl.

The dimensions of the closet conform to all others, so that it can be substituted for any one in use without change of soil-pipe connections; it can be reversed to be conveniently supplied from either right or left. The tank can be put at any desired height from the floor.

By the invention of this closet, no doubt a great point has been achieved by the adoption of means governed by natural laws, to take the place of those mechanical working parts of a water-closet which cannot be relied upon, and are causing constant trouble and annoyance, and for such reasons alone, preference should be given to the "Tidal Wave" in every instance wherever a first-class, reliable sanitary closet is wanted.

HENRY HUBER & CO., Manufacturers,
85 Beekman St, New York.

PROPOSALS.

SCHOOL-HOUSE.
[At Owatonna, Minn.]

Owatonna, Minn., June 15, 1882.

I will receive sealed proposals **until July 4, 1882,** to build a brick school-house in Owatonna according to the plans and specifications to be seen in my office on and after June 24. Full particulars and terms given upon application to the undersigned. The right is reserved to reject any and all bids. W. A. DYNES, Clerk of the Board of Education. 340

SCHOOL-HOUSE.
[At California, O.]

Sealed proposals will be received at the office of the Clerk of the Board of Education of Anderson Township, California, Hamilton County, O., **until 12 o'clock, at noon, on the 8th day of July, 1882,** for building a school-house, on a lot situated in Subdivision Number 10, according to plans and specifications on file in this office. Each bid must contain the name of every person interested in the same, and be accompanied by a sufficient guarantee of some disinterested person that if the bid is accepted a contract will be entered into and the performance properly secured. The bid for each kind of material called for by the specifications must be stated separately, and the price given, and the price of labor must also be separately stated.

None but the lowest responsible bid will be accepted.

The Board may reject any and all bids.

By order of Board of Education.

340 E. R. van Rensselaer, Clerk.

PROPOSALS.

DECORATIVE PAINTING.
[At Washington, D. C.]

Office of Building for State, War and Navy Departments,
Washington, D. C., June 21, 1882.

Sealed proposals and designs for the decorative painting of the walls, ceilings and iron finish of six rooms, large and small, in the north wing of the building for State, War and Navy Departments, in this city will be received at this office **until 12 M., on July 12, 1882,** and opened immediately thereafter in presence of bidders.

Specifications, general instructions to bidders, and blank forms of proposal, will be furnished to regular decorative artists on application to this office.

THOS. LINCOLN CASEY,
340 Lt.-Col. Corps of Engineers.

IRON FURRING AND LATHING.
[At Albany, N. Y.]

Office of the Supervising Architect,
Treasury Department,
Washington, D. C., June 10, 1882.

Sealed proposals will be received at this office **until 12 M., on the 26th day of June, 1882,** for furnishing and fixing in place complete all the iron furring and lathing, corrugated-iron arching and iron partitions, etc., required for the United States custom-house and post-office at Albany, N. Y., in accordance with drawings and specifications, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,
339 Supervising Architect.

PROPOSALS.

FIRE-PROOF SHUTTERS, BOXES, ETC.
[At Boston, Mass.]

Office of Supervising Architect,
Treasury Department,
Washington, D.C. June 20, 1882.

Sealed proposals will be received at this office **until 12 M., on the 14th day of July, 1882,** for furnishing and putting in place complete the Fire-Proof Shutters, Boxes, etc., required for the United States Post-Office and Sub-Treasury Extension at Boston, Mass., in accordance with drawings, specification and schedule, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,
Supervising Architect.

WATER-SUPPLY AND SEWERAGE.
[At Nictheroy, Brazil.]

New York, June 15, 1882.

By order of the Brazilian Legation at Washington, the undersigned makes public that the Government of the Province of Rio de Janeiro calls for proposals for the works of water-supply and sewerage of the City of Nictheroy, capital of the province. The proposals, addressed to the Brazilian Legation at Washington, must be sent **until 3 o'clock in the afternoon of the 4th day of July next,** to the Brazilian consulate-general, No. 42 Broadway, New York, where copies of the general conditions and specifications can be obtained, as well at any information in relation to this matter. SALVADOR DE MENDONCA,
340 Brazilian Consul-General in the United States.

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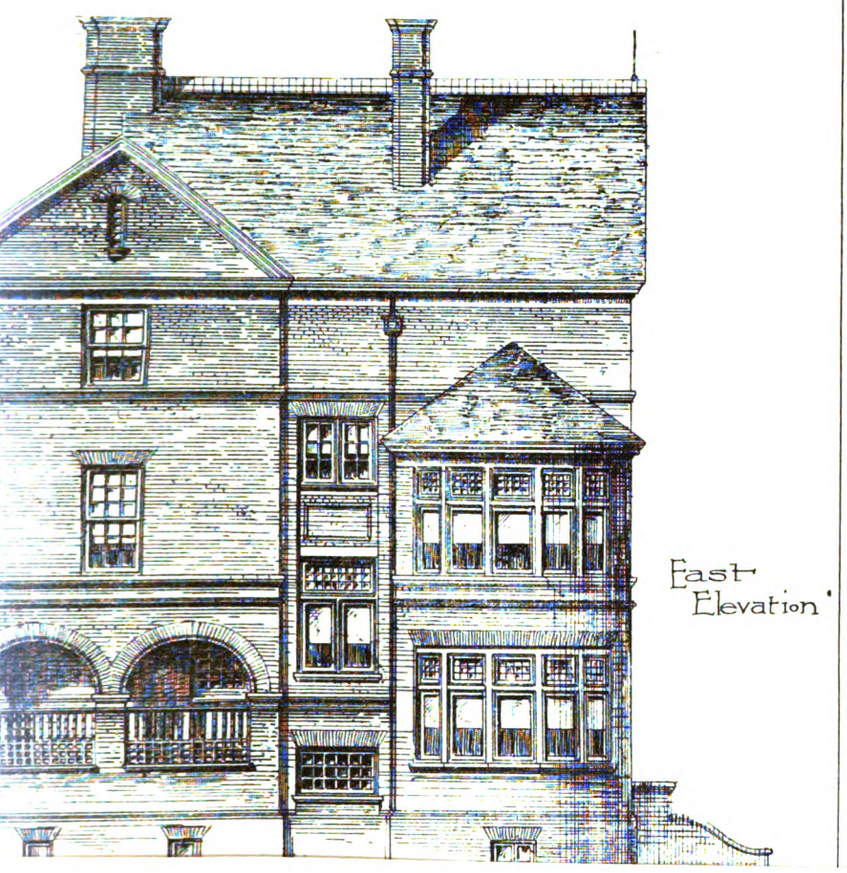
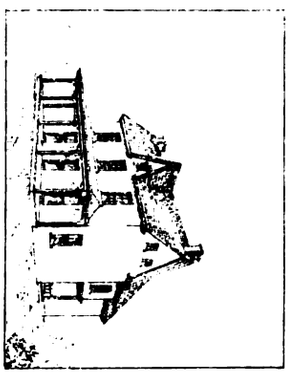
No. 340



East Elevation



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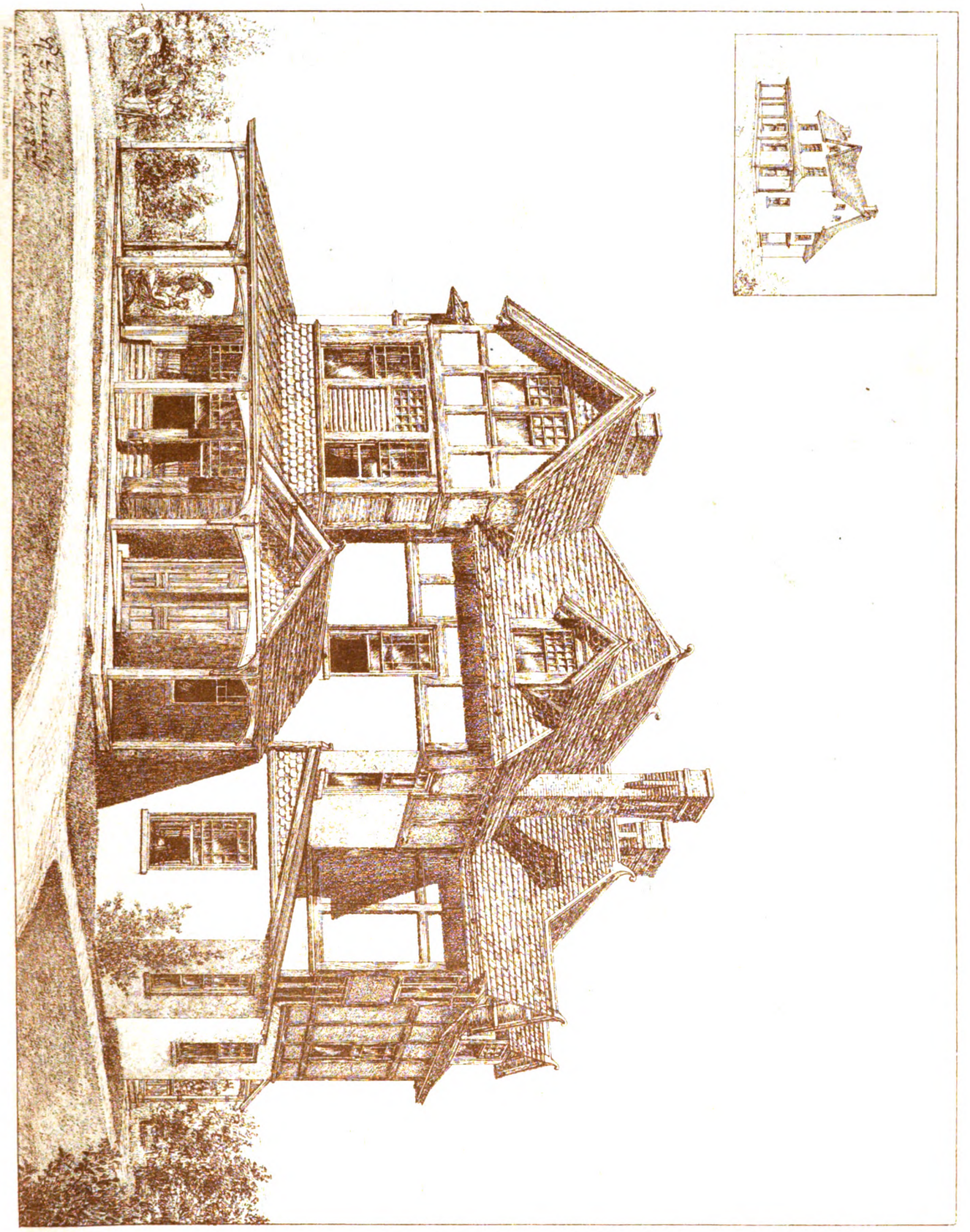

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WANTED.

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PROPOSALS.

CUT-STONE WORK, BRICKS, CEMENT, LIME AND SAND. [At Toledo, O.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., June 16, 1882.

Sealed proposals will be received at this office, **until 12 M., on the 7th day of July, 1882,** for furnishing and delivering ready for setting, all the cut-stonework required for the Basement and Area Walls and Piers of the United States Court-House and Post-Office at Toledo, O.; also for supplying and delivering all other materials required, bricks, cement, lime and sand, in accordance with drawings and specifications, copies of drawings and specifications for stone-work, and copies of schedule and specification of materials, together with any additional information may be had on application at this office, or the office of the Superintendent. JAS. G. HILL,

340 Supervising Architect.

PUMPS. [At Hoboken, N. J.]

Sealed proposals for the furnishing and erecting of a pump or pumps sufficient to keep dry that portion of the meadows lying adjacent to the Ravine Road sewer and Ferry Street, and also the cost of operating the same for a term of one year from the completion of the necessary works will be received at the office of the City Clerk **until Tuesday evening, July 4, 1882, at 7 1-2 o'clock.**

Proposals to be addressed "The Mayor and Council of the City of Hoboken," endorsed "Proposals for the furnishing and erecting of a suitable pump or pumps," etc.

All proposals must be made out on blanks furnished by the City Clerk, and accompanied by a bond signed by two responsible freeholders in a penal sum equal to the amount of the bid.

All bids not in due form will be thrown out.

The Mayor and Council reserve the right to reject any or all bids if deemed in the interest of the city so to do.

By order of the Council.

340 L. H. KENDRICK, City Clerk.

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PROPOSALS.

BRICK, CEMENT, LUMBER, ETC. [At Rock Island, Ill.]

ROCK ISLAND ARSENAL, ILL., June 6, 1882.

Sealed proposals are invited to furnish, delivered on cars or wagons at the arsenal, the brick, lime, hydraulic cement, coke, coal (bituminous, anthracite and blacksmith), lumber and glass, that may be required at this arsenal from date of contract to June 30, 1883.

Bills of the materials with approximate quantities, specifications as to the quality and other requirements, can be obtained from the undersigned.

The successful bidder will be required to enter into contract and give good and sufficient bond for the faithful performance of the same. Bids for bituminous coal delivered on cars in the city of Rock Island will be accepted. The government reserves the right to reject any or all bids; the quantities of materials to be furnished depend upon appropriations for buildings yet to be made by Congress, and after contracts are awarded, only such materials will be furnished as may be required and are ordered from time to time by the commanding officer of the arsenal.

Proposals should be in triplicate, sealed and endorsed "Proposals for materials." **Bids will be opened at 10 A. M., July 5, 1882.** Bidders are invited to be present at the opening.

D. W. FLAGLER,

340 Lt.-Col. of Ord. Commanding.

COURT-HOUSE. [At Saginaw, Mich.]

Consolidated sealed proposals will be received by me **until 12 M., July 19, 1882,** for the furnishing of material and the erection of a stone and brick Court-House for the county of Saginaw, at the City of Saginaw (estimated cost not exceeding $100,000). The building to be constructed according to plans and specifications drawn by F. W. Hollister, architect, Saginaw, Mich., which may be seen at the office of the County Clerk of Saginaw County. Each bid must be accompanied by a deposit of $300 in cash, or a certified check for that amount, as a guaranty that the party bidding will, within 10 days, if his bid be accepted, enter into a contract for the completion of said work, and give a satisfactory bond for the faithful performance of the work awarded him. Work to be commenced immediately upon the execution of the contract, and the building completed on or before January 1, 1884.

Payment will be made in cash upon estimates made by the architect, or person appointed to superintend said work, as the work progresses, the City reserving 20 per cent upon each payment until the completion and acceptance of the building.

The right to reject any or all bids is hereby reserved.

By order of the Common Council of the City of Saginaw.

D. C. DIXSON, Comptroller.

PROPOSALS.

CANAL LOCKS. [Canada.]

DEPARTMENT OF RAILWAYS AND CANALS, OTTAWA, May 22, 1882.

Sealed tenders, endorsed "Tender for Trent Navigation," will be received at this office **until the 5th day of July next,** for the construction of two lift locks, bridge-piers, and other works at Fenelon Falls; also, the construction of a lock at Buckhorn Rapids, and for the construction of three locks, a dam, and bridge-piers at Burleigh Falls.

The works at each of these places will be let separately.

Maps of the respective localities, together with plans and specifications of the works can be seen at this office on and after Wednesday, the 21st day of June next, where printed forms of tender can be obtained. A like class of information relative to the work at Fenelon Falls will be furnished at that place, and for those at Buckhorn and Burleigh information may be obtained at the resident engineer's office, Peterborough.

Contractors are requested to bear in mind that tenders for the different works must be accompanied by an accepted bank check as follows: —

For the Fenelon Falls work, $1,000.
For the Buckhorn Rapids work, $500.
For the Burleigh Falls work, $1,500.

By order. F. BRAUN, Secretary.

SEWERAGE SYSTEM. [At Pietermaritzburg, Natal, Africa.]

The Town Council of Pietermaritzburg, Natal, invite plans and specifications, with approximate estimate of cost, of a complete system of sewerage suitable for the city. A premium of £100 (one hundred pounds) stg. will be awarded to the author of the selected plan, such plan to become the absolute property of the Corporation, all others being returned free of expense. Plans under motto or *nom de plume* (competitor's real name to be inclosed in envelope), addressed to Mr. E. Wilshire, Town Clerk, Town Office, Pietermaritzburg, Natal, and indorsed "Plans for Sewerage of City," will be received at the Town Office **up to 12 noon on the 4th September.** A plan of the city can be seen and further information that may be required obtained on application any day during office hours to Walter Peace, Esq, Natal Emigration Agent, 21 Finsbury-circus, London, E. C.; John A. Roos, Secretary, Town Council, Cape Town; W. P. Perlin, Esq., Town Clerk, Port Elizabeth; John A. Boag, Esq., Town Clerk, Kimberley; and the Town Clerk, Pietermaritzburg. 340

ELEVATOR. [At Cincinnati, O.]

AUDITOR'S OFFICE, HAMILTON CO., O., CINCINNATI, June 17, 1882.

Sealed proposals will be received at the office of the County Commissioners of Hamilton County, **until 12 o'clock, M., July 12, 1882,** for the building of two passenger-elevators in the Court-House, as per general specifications on file in the office of the County Commissioners. Also, bids for the building of two towers, to receive said elevators, according to plans and specifications on file in said Commissioners' office. Bids for said elevators and towers may be joint or separate, and all bids for elevators must be accompanied with full drawings, plans and specifications, and must designate the safety attachment that will be used on the elevators proposed. The work to be completed within ninety days from date of contract.

The right to reject any or all bids is reserved.

341 W. S. CAPPELLER, County Auditor.

JAIL. [At Rio Grande City, Tex.]

Sealed proposals, with plans and specifications fixing time of commencement and completion of work, with terms of payment, will be received for the erection of a county jail in Starr County, Tex., two st'y, walls of brick and mortar, foundation of brick and cement, 28' x 30', and 24' from top of foundation to wall-plate, to have an iron cage or cell large enough to hold ten prisoners. The upper and lower stories to be divided into the necessary offices, corridors, lock-ups, etc., in that will best insure security, proper ventilation and convenience, and where necessary the openings to have iron doors and gratings, in addition to wooden shutters.

Bids will be opened in presence of the commissioner's court **July 5, 1882, at 12 M.,** the county reserving the right to reject any or all bids.

There is now in the county treasury, for the above purpose, $4,500, which it is hoped will be sufficient, but if not, bonds will be issued for the balance, the whole cost of jail not to exceed $8,000.

For further information address the county judge, at Rio Grande City, to whom bids will be directed, endorsed "Proposals for Building County Jail."

JAMES I. NIX, Clerk C. C. S. C.

By order of the Court.

IRON ROOFS, ETC. [At Topeka, Kan.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., June 20, 1882.

Sealed proposals will be received at this office, **until 12 M., on the 12th day of July, 1882,** for furnishing and fixing in place complete the iron roofs, etc., required for the United States Court-House and Post-Office at Topeka, Kan., in acordance with drawings and specifications, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL, Supervising Architect.

IRON BRIDGE. [At Sycamore, O.]

AUDITOR'S OFFICE, HAMILTON COUNTY, O., CINCINNATI, June 15, 1882.

Sealed proposals will be received at the office of the Butler County Commissioners, Hamilton, O., **until Friday, July 21, 1882, at 12 o'clock, M.,** for an iron superstructure over Irvin's Run, east of Charles Krauskopf's, on the County Line Road, in Sycamore Township. Length in clear, 38 feet; requisite strength, 90 pounds to the square foot; clear width, 18 feet. Five will be used at a factor of safety. Ultimate compression, 42,000 pounds to the square foot. Ultimate tension, 60,000 pounds to the square foot. Three panels, 14 feet each. Height of truss, 8 feet.

N. B. — Bidders will also bid on a plate-girder bridge, giving on strain sheet number and size of I-beams used. A full and complete strain sheet must accompany each bid.

The Commissioners reserve the right to reject any or all bids. Proposals should be indorsed as above, and addressed to the Commissioners of Butler County, Hamilton O. W. S. CAPPELLER, County Auditor.

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FIRE! FIRE! FIRE!

In the fire that occurred at my place May 17th, a number of copies of the valuable work "Cummings' Architectural Details" (contents given below), were injured by water, smoke, and some by fire. In all cases the plates are perfect, but the book is marred in appearance; in consideration of which I have concluded to offer it in 3 lots, as follows:

1st. Copies slightly soiled by smoke, ... **$4.00**
2d. Copies soiled by smoke and water (Some in Portfolio), ... **3.00**
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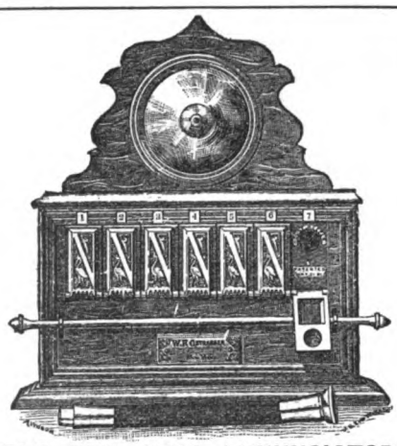

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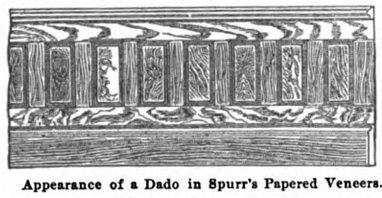

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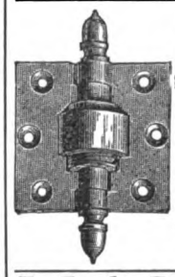

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pounds, and on the last four of 36,800 pounds to 42,550 pounds. (The average load under which the first six broke was about 380,000, for the last four 250,000 pounds.)

From mill 3 there was one old oak column of whose history nothing was definitely known. Tested between the platform of the machine it broke under 6,147 pounds per square inch.

These eighteen were all the old oak columns tested. It will be noticed that in two cases a strength of a little over 6,000 pounds per square inch is obtained, but that in no other case does the strength exceed 5,000 pounds, and that in one case it fell as low as 2,943 pounds.

The next set of posts consisted of two white-oak posts, left untested from November, 1881. The first tested with even bearings against platforms of machine, gave a crushing strength of 3,219 pounds per square inch. A short block of much better quality gave 4,450 pounds per square inch. The second post, which was also a poor one, was tested with an eccentric load (2¾ inches out from centre). Its diameter was 10.95 inches. It broke under a total load of 170,000 pounds, whereas it would have been 276,480 if it had possessed a crushing strength of 3,000 pounds per square inch.

The remaining blocks and posts were of yellow pine, furnished by Messrs. Stetson & Mosely, and were each four in number. A square yellow-pine post, about thirteen feet long and ten inches on side, with pintle at one end, broke under 5,220 pounds per square inch. A second square post, same length and about nine inches on side, tested with one flat end, one rounded end, and vertical axis 2¼ inches eccentric, broke under 280,000 pounds total load. Two yellow-pine blocks, each two feet long of square section, respectively nine inches and ten inches on side, broke under 5,950 pounds per square inch and 5,452 pounds per square inch. A yellow-pine round post, twelve feet long and eight inches diameter, tested with one flat and one rounded end, had an ultimate strength of 4,662 pounds per square inch. A block two feet long, cut from end of this, broke under 3,604 pounds per square inch. A second round post, fourteen feet long and 7.9 inches diameter, tested with flat ends, broke under 4,254 pounds per square inch. A two-foot block, cut from the end of this, broke under 4,892 pounds per square inch. A third round block, two feet long and 10.9 inches in diameter, broke under 4,450 pounds per square inch.

After a brief statement in regard to the results obtained, Professor Lanza said "In concluding, I can only reiterate what I said in my former communication in regard to the importance to our mill corporations of having a thorough investigation made of these matters, involving complete series of tests in which the conditions of practice are approximated to as nearly as possible, and I would urge the importance of the same kind of investigation to those railroad companies which use wooden bridges."

Professor Lanza then described, by the aid of photographs projected upon the screen, the 50,000-pounds "testing-machine" recently acquired by the Institute. This machine is now so arranged as to be used either for measuring the tensile strength of materials, or the transverse strength. Its use is primarily for giving to the students an opportunity to acquire a familiarity with the principles and practice of testing the strength of materials, and each student makes several measurements with the machine. Specimens of boiler iron, iron rope, etc., broken in the machine were shown, and a number of pieces of spruce beams which had also been tested were exhibited.

The results of some of the students' work upon large spruce beams were given in a table upon the board. These beams were broken transversely, and were about twenty in number, varying in size from 4" x 12" and 20' long to 2" x 7" and 7' long. The average modulus of rupture for spruce as obtained from these is about 4,623 pounds per square inch. These are the first experiments made on full-sized beams, and it is, therefore, of interest to compare them with the figures given by various authors and now in general use among engineers:

Hatfield gives for spruce			13,365 lbs.
Laslett	"	"	12,210 "
Rankine	"	"	11,100 "
Rodman	"	"	6,100 "
Trautwine	"	"	8,100 "

The latter advises a deduction of one-third for knots, etc., which would leave 5,400 pounds, a result greater than all but two given by any of the tests described.

After some discussion upon the subject, the audience was invited to inspect the machine in the laboratory in the basement, and there to witness the breaking of a 4" x 12" spruce beam, 16' long.

THE ILLUSTRATIONS.

CHRIST CHURCH ORPHANAGE, BALTIMORE, MD. MESSRS. WYATT & SPERRY, ARCHITECTS, BALTIMORE, MD.

THIS building is being erected *in memoriam* by the family of George H. Williams, Esq.

HOUSE AT NAVESINK PARK, N. J. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

This house stands on a bluff overlooking the water, with Sandy Hook in front and New York in the distance to the left. The house is finished in pine stained cherry-red on first floor.

ALTERATIONS IN THE HOUSE OF H. PEALE, ESQ., NEAR DARBY, PA. MR. R. G. KENNEDY, ARCHITECT, PHILADELPHIA, PA.

CRUSHING STRENGTH OF MARBLE AND SANDSTONE.

Font in Winchester Cathedral - Eng:

PROF. F. E. KIDDER has just finished the following tests on the crushing strength of Vermont marble and brown sandstones, in behalf of the Committee on Building Materials of the Massachusetts Charitable Mechanic Association. The following description of the tests is taken from his report to the Committee:

These tests were made with the government testing-machine at the United States Arsenal, Watertown, Mass., and every precaution was taken to secure accurate and reliable results.

SUTHERLAND FALLS, VERMONT, MARBLE (White): — This marble is quarried by the Vermont Marble Company, Centre Rutland, Vt. The two specimens tested were exhibited at the recent fair of the Association.

Block No. 1. No. 1. quality, "V" layer. Weight, 180 lbs. per cubic foot. Size, 6" x 6.08" x 5.96". Sectional area, 35.9 square inches. *Ultimate strength*, 404,000 *lbs.* (11,250 *lbs. per square inch*).

The faces of the block were rubbed so as to fit almost perfectly the parallel plates of the testing-machine. This block commenced to crack around the edges under 350,000 lbs. pressure (9,750 lbs. per square inch), and failed suddenly under 404,000 lbs.

Block No. 2. Same kind and quality as No. 1. Size, 6" x 6" x 6.02". Sectional area, 36.12 square inches. *Ultimate strength*, 370,000 *lbs.* (10,243 *lbs. per square inch*).

This block did not crack at all until it gave away entirely under a pressure of 370,000 lbs.

According to a statement made by Mr. Hiram A. Cutting in the *American Architect* of December 3, 1881, the crushing strength of two-inch cubes of this marble as tested in the government testing-machine ranges from 12,250 lbs. to 20,000 lbs. per square inch, a much larger value than that obtained on the six-inch cubes. This stone is entirely disintegrated by crushing, so that the pieces can be reduced to a fine powder between the thumb and finger. It is interesting to note the mode of fracture of these blocks. When taken from the machine after having been crushed, the block was divided into two cones lapping by each other, the height of each being the thickness of the block, and the compressed faces forming the bases of the cones. The sides of the blocks all broke off, leaving the cones entirely separate. Both blocks fractured in the same way.

BROWNSTONE FROM THE BAY OF FUNDY QUARRYING COMPANY. — Samples of the three following varieties of brown sandstone were furnished for testing by the Boston agents of the Bay of Fundy Quarrying Company:

MARY'S POINT, N. B., STONE: — This stone is a fine-grain dark-brown sandstone.

Block No. 1 measured 4.04" x 4.04" x 8". Sectional area, 16.3 square inches. *Ultimate strength*, 127,600 *lbs.*, *or* 7,828 *lbs, per square inch.*

The stone commenced to crack at the corners and along the edges under 108,000 lbs. pressure, and continued cracking until it suddenly broke into a great number of pieces under 127,600 lbs. pressure.

Block No. 2 measured 4" x 3.75" x 7". Sectional area, 15 square inches. *Ultimate strength*, 113,800 *lbs.*, *or* 7,586 *lbs. per square inch.*

The stone commenced to crack near one corner under a pressure of 31,000 lbs., and under 77,000 lbs. it was very badly cracked. It flew from the machine in fragments when the pressure reached 113,800 lbs.

WOOD'S POINT, N. B., SANDSTONE: — This stone is of about the same color as the Mary's Point stone, but it has a much coarser grain and is not very hard.

Block No. 1 measured 4.03" x 4.03" x 8". Sectional area, 16.2 square inches. *Ultimate strength*, 80,000 *lbs.*, *or* 4,932 *lbs. per square inch.*

Commenced to crack at 50,000 lbs., on the corners, and continued cracking along the edges and at the corners until it was crushed under 80,000 lbs. pressure.

Block No. 2 measured 4" x 3.98" x 7.25". Sectional area, 15.92 square inches. *Ultimate strength*, 62,500 *lbs.*, *or* 3,976 *lbs. per square inch.*

This stone commenced to crack under a pressure of 44,000 lbs.

LONGMEADOW STONE. — The Bay of Fundy Quarrying Company also quarry a variety of the Longmeadow, Mass., sandstone, which is a reddish-brown in color.

Block No. 1 measured 3.80" x 3.87" x 7.42". Sectional area, 14.71 square inches. *Ultimate strength*, 200,000 *lbs.*, *or* 13,596 *lbs per square inch.*

This stone showed no cracks whatever until the pressure had reached 152,000 lbs., when it commenced to crack at the corners. When the pressure reached 200,000 lbs., the stone suddenly flew from the machine in fragments. This stone did not fit into the machine very perfectly.

Block No. 2 measured 3.39" x 3.97" x 7.5" Sectional area, 15.6 square inches. *Ultimate strength*, 142,300 *lbs.*, *or* 9,121 *lbs. per square inch.*

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The stone commenced to crack along the edges under a pressure of 47,000 lbs. Under 78,000 lbs., a large piece of the stone split off from the bottom of the block, and under 142,300 lbs. pressure the stone failed, cracking very badly.

Brown Sandstone from East Longmeadow, Mass: — Quarried by Norcross Brothers & Taylor, of East Longmeadow. This firm works several quarries, the stone differing in the degree of hardness, and a little in color, which is a reddish-brown. The different varieties take the name of the quarry from which they come.

Soft Saulsbury Brownstone: — This stone is one of the softest varieties quarried by this firm, although it is about as hard as the ordinary brownstones. The specimens tested were selected by the foreman of the stone-yard without knowing the purpose for which they were to be used, and were rather below the average of this stone in quality.

Block No. 1 measured 4″ x 4″ x 7.58″. Area of cross-section, 16 square inches. *Ultimate strength*, 141,000 *lbs.*, or 8,812 *lbs per square inch.*

Stone did not commence to crack until the pressure had reached 130,000 lbs.

Block No. 2 measured 4″ x 4″ x 7.85″. Area of cross-section, 16 square inches. *Ultimate strength*, 129,000 *lbs.*, *or* 8,062 *lbs. per square inch.*

There were no cracks in the specimen when it was under 100,000 lbs. pressure.

McGregory Brownstone: — This is one of the hardest and finest of the Longmeadow sandstones.

Block No. 1 measured 4.16″ x 4.16″ x 8″. Sectional area, 17.3 square inches. *Ultimate strength*, 233,900 *lbs.*, *or* 13,520 *lbs. per square inch.*

Stone did not commence to crack until the pressure had reached 220 000 lbs., almost the crushing strength.

Block No. 2 measured 4.15″ x 4.15″ x 8″. Sectional area, 17.2 square inches. *Ultimate strength*, 252,000 *lbs.*, *or* 14,650 *lbs. per square inch.*

This specimen did not commence to crack until the pressure had reached 240,000 lbs., or 13,953 lbs. to the square inch.

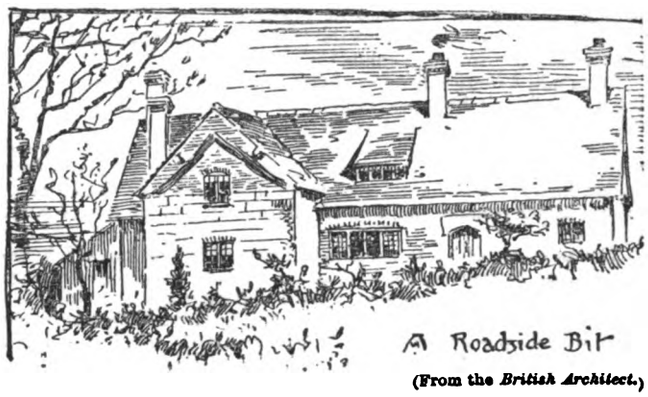
The following table is arranged to show the sectional area and strength of each specimen, and the average for each variety of stone. The cracking strength, so to speak, of the stone, is of considerable importance, for after a stone has commenced to crack its permanent strength is probably reached, for if the load which caused it to crack were allowed to remain on the stone it would probably in time crush the stone. In testing the blocks, however, some inequality in the faces of the block might cause one corner to crack, when the stone itself had not commenced to weaken.

Name of stone.	Sectional area.	Ultimate strength per sq. in.	Pressure per sq. in. under which stone commenced to crack.	Ultimate strength of specimen.
	sq. ins.	lbs.	lbs.	lbs.
Marble.				
Block No. 1	37.9	11,250	9,770	404,000
Block No. 2	36.12	10,243	10,243	370,000
Average		10,748	9,996	
Sandstones. — *Mary's Point.*				
Block No. 1	16.3	7,828	6,626	127,600
Block No. 2	15	7,586	2,066	113,800
Average		7,707	2,346	
Wood's Point.				
Block No. 1	16.2	4,932	3,044	80,000
Block No. 2	15.92	3,976	2,763	62,500
Average		4,454	2,903	
Longm eadow Stone (Bay of Fundy Quarrying Company's).				
Block No. 1	14.71	13,506	10,333	200,000
Block No. 2	15.6	9,121	3,012	142,300
Average		11,358	6,672	
Saulsbury Stone.				
Block No. 1	16	8,812	8,250	141,000
Block No. 2	16	8,062	6,500	129,000
Average		8,437	7,375	
McGregory.				
Block No. 1	17.3	13,520	12,716	233,900
Block No. 2	17.2	14,650	13,953	252,000
Average		14,085	13,334	

General Q. A. Gillmore, a few years ago, tested the strength of many varieties of sandstone by crushing two-inch cubes. The results obtained by him ranged from 4,350 lbs. to 9,850 lbs. per square inch. Comparing the strength of the stones tested by me with these values, we find that the specimens of McGregory sandstone had a strength far above the average for sandstones, and the other specimens have about the same values as those obtained by General Gillmore.

We would expect, however, smaller values from blocks 4″ x 4″ x 8″ than from two-inch cubes, for, as a rule, small specimens of almost any material show a greater strength than large specimens.

It is interesting to note the mode of fracture of the blocks of brownstone, which was the same for each specimen. The blocks fractured by the sides bursting off, and when taken from the machine the specimens had the form of two pyramids, with their apexes meeting at the centre, and having for their bases the compressed ends of the block. The pyramids were more clearly shown in some specimens than in others, but it was evident that the mode of fracture was the same for all specimens.



(From the *British Architect.*)

POPLAR.

THIS tree is called whitewood and yellow poplar, from the color of its timber; canoe-wood, from the use made of it by the native Indians, and saddle-tree, from the form of its leaves. In Britain it is called virgin poplar, tulip-bearing lily tree and saddle-tree. In Kentucky and Tennessee it has the name whitewood and yellow poplar. In other parts of the United States it has been called the tulip tree, and the curious name of old-wife's-shirt tree. It is the tulip-bearing *liriodendron* of North America.

The poplar attains the greatest dimensions of all the indigenous deciduous trees of North America. With its perfect straightness, uniform diameter of trunk, regular distribution of branches, richness of foliage and flowers, it stands unrivalled, the most magnificent production of the temperate zones. It usually reaches a height of 60 or 80 feet, with a diameter varying from 18 inches to three feet, and in favorable localities it has been found rising to the height of 120 to 140 feet, with a diameter of more than seven feet. In 1842 a tree was felled on the estate of Mr. John Lewis, in Llangollan, Ky., which measured eight feet in diameter, near the ground, and five feet at 75 feet from the ground. The trunk was perfectly straight. In 1807 there was a tree in Hamilton, Adams county, Pa., which had a circumference of 36 feet, with trunk rising 30 or 40 feet to the forks. It is well authenticated that near the head of the Roanoke River there was a tree 39 feet in circumference at a distance of four feet from the ground, and it was a distance of 40 feet to the forks. The bark of the trunk, while the tree is small, is smooth and even; when it exceeds seven or eight inches in diameter it begins to crack, and presents furrows, which increase in depth in proportion to the age of the tree. . . .

The natural distribution of the poplar embraces a large part of the area of the United States. It is found in its natural state at the southern extremity of Lake Champlain, along the Connecticut River, reaching no farther north or east than these localities, and apparently avoiding the sea-coast, as it is not found indigenous in the eastern portions of the Atlantic States, or the southern portion of the states bordering on the Gulf of Mexico. It is multiplied in the Middle States, in the upper parts of the Carolinas and Georgia, and becomes still more abundant in the Western States, particularly in Kentucky, where it displays its greatest productiveness and most perfect development. It delights only in deep, loamy, and extremely fertile soils, such as are found in the rich bottoms along rivers, and on the borders of the great swamps occupied by forests. Its comparative rareness in maritime regions is due to the thin and dry soil, and to the excessive wetness of the swamps of the rivers. It is usually found mingled with other trees, such as hickories, black walnut, wild cherry and butternut, although at some places it alone constitutes considerable tracts of a forest.

Like the most of trees it will grow on soils of different qualities, the tree and its qualities clearly showing the effect of the surrounding circumstances. It has been introduced into Europe, and will variedly flourish in all parts not too far north. In dry, gravelly soil, and in exposed places, the dwarfing effects are plainly seen. It will not thrive even where there is a subsoil of clay. The introduction to England is said to have been made by the Earl of Norfolk, as far back as 1673. Now, it may be found in Germany, Italy, and France, in their gardens, and along avenues, where it is prized for its umbrageous magnificence. The most favorable situation is where it is sheltered from high winds, with sufficient exposure to light and air to admit of the maturation of its leaves on every side, and the perfect ripening of the wood to enable it to resist the frosts of winter. The oldest tree in England is estimated to be 150 years of age. It is at Fulham Palace, and is 50 feet high. The largest specimen is at Hestercombe, it being 100 feet in height, and three feet in diameter. Some have attained a large size at Vienna, but none will grow north of Warsaw or Moscow without careful protection. At Scwobber, near Hanover, there is a tree, in rich soil, over 120 years old, which is 80 feet high, and 30 feet in circumference. Seventy or 80 feet in height is attained in Italy. There is an account in history of the Empress Josephine's gardener attempting to gather seeds from a poplar at Lacken, near Brussels, and how he fell and broke his neck. It is successfully cultivated along our coast, from Newburyport, Mass., to St. Mary's, in Georgia.

The tree is propagated from the seeds which are planted in the

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autumn and come up in the spring. As the roots are scanty in extending fibres, it does not admit of ready transplanting.

The timber is compact and fine-grained, with qualities rendering it easily polished. A cubic foot, when dry, weighs 25 pounds. The heart, when perfectly seasoned, resists well the influence of the air, and is rarely attacked by insects. Its greatest defect, unless carefully and properly seasoned, is the liability to shrink and warp by the alternations of moisture and dryness. The nature of the soil has a marked influence on the color of the wood, which is distinguished by the names white and yellow poplar, although at the present time both varieties are known by the common name whitewood. The white grows upon the elevated places where the tree abounds and may be recognized by the branchy summit. There is said to be some difference in the grain, but if so, it is too slight for consideration. In the early days of New York and Philadelphia this wood was extensively used in the construction of houses. It was used for rafters and joists in the upper stories, and was much esteemed for its lightness and strength. As the wood became scarce in the vicinity, pine very naturally took its place. In the Middle, Southern, and Western States, where the tree grows abundantly, it has been, and still is, extensively used, and is considered a good substitute for pine, red cedar and cypress, and serves well for the interior work of houses as well as for external covering. The panels of doors, wainscots, and mouldings of chimneys are made of the wood, and shingles have been made in some states. These shingles are preferred by some to pine, because they are more durable, and not liable to crack from the effects of intense frost and sunshine. Lumber sawed from this tree is used in all the principal cities for the panels of carriages. When perfectly dry they take paint well and admit of a brilliant polish. It enters largely into coach manufacturing, and is used in cars, wagon-boxes, sleighs, etc. The Studebaker Brothers Manufacturing Company, South Bend, Ind., contracted for 1,000,000 feet from one firm. It is particularly applicable to any work requiring soft wood easily worked, and not requiring great strength, especially if wide work is desirable. It was used years ago in large quantities in the manufacture of trunks, which were covered with cloth and skins. Large quantities of tables and bedsteads have been made from the wood. They are usually stained to imitate mahogany. It often enters into the construction of bureaus and general cabinet-work, particularly where it is the base for covering with veneer. It has been used also in the interior work of canal boats and steamboats. As it is easily wrought in the lathe, and is often used for bowls, brush and broom handles, and numerous other articles of turned wares. Farmers construct eating and drinking troughs for their animals of the wood, as it stands long exposure to the weather better than chestnut or butternut. It is used also in bridges in some places. The Indians were wont to make canoes from the big trees, and some of them had room for twenty or more persons. In some parts of the country long lines of fences may be seen that are made of rails from this tree. One-third of the lumber used in making coffins in New York city is whitewood, it being used for the sides and tops. Very large quantities are consumed in the backs and legs of pianos. Furniture manufacturers use it for ebonizing, and in parts where great strength is not required. A manufacturer of bungs in New York uses 500,000 feet annually, and it is also used largely in the making of toys and pumps. It has been used to some extent for flooring, and quite extensively for mouldings and trimmings.

It is exported, but not extensively. Shipments are occasionally made of quantities of logs, sometimes reaching as high as 50 or 60. The shipment of lumber is rarely, if ever, made at the present time.

In consumption whitewood stands next to pine, and there are over 50,000,000 feet annually used in New York. Where good pine uppers are quoted at $65 whitewood of the same grade is only $40. As a matter of economy many will therefore use it, especially where it will supply well the place of pine.

It is a good wood for the production of charcoal, yielding 22 per cent.

And yet after all its importance in architectural art, this is not all: the bark has been long used as a medicine, and is considered by some scarcely inferior to cinchona. It is a domestic remedy for the intermittent fever, the bark, with equal parts of dogwood bark, being steeped in brandy for some days, and the tincture or decoction thus prepared taken freely. The bark is reduced to a powder by some, and used as a vermifuge. It was a favorite remedy among the American Indians in intermittents. — *Correspondence of the Northwestern Lumberman.*

CEMENT FACINGS.

196 BROADWAY, NEW YORK, June 27, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The best work in entire façade facings, ornaments, copings, etc., of Portland cement-concrete is done by Messrs. G. A. L. Schultz & Co., 13 *a* Bruecken Strasse, Berlin, S. O. The work is expensive, only the very best material being employed; but it stands hard like a rock, and if desired, can be given the color of granite. If "Subscriber" will favor me with a call, I can show him a catalogue of Messrs. Schultz, also a sample of their concrete for entire façades. I am, dear sirs, yours respectfully,

GUSTAV GRAWITZ.

STRENGTH OF PORTLAND CEMENT-MORTARS.

NEW YORK, June 27, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — In replying to my letter with regard to his tests on brick piers laid in different mortars, Mr. F. E. Kidder does not dispute the theory that Portland cement should not be mixed with lime. This theory is a thoroughly established fact in Germany, and the reason given in my first letter speaks also in its favor.

General Q. A. Gillmore, U. S. Engineers, says: "All attempt to cheapen a matrix of Portland cement by the substitution of common lime, for a portion of the cement, result in a sacrifice of strength in proportion to the extent of the adulteration, and the ratio of loss is not materially changed by the increased induration due to age. This is specially true in thick walls or larger masses of masonry, of which the portion which hardens by dessication and the absorption of carbonic acid at the surface forms a small portion of the entire mass."

The result of tests made with various bastard mortars were published in the "*Deutsche Bauzeitung*," and later in the "*Zeitschrift des Architekten und Ingenieur-Vereins*," at Hannover (1877, page 590), and some elaborate experiments were made by Mr. F. Kuhn, the engineer engaged in the construction of the bridge over the river Elbe at Dresden, and published in the last mentioned paper (1878, vol. XXIV. No. 4). Mr. Kuhn says: "There is an old custom still held in some favor, of mixing lime with Portland cement, a proceeding sanctioned by ancient rules and instructions for improving a lime-mortar by adding Portland cement. In some cases this compound realizes higher compressive results, and in all other directions it fails to command any beneficial influence whatever, but on the contrary, as the following table will show, tends to depreciate the value of all mortars, where such a combination is made."

TABLE OF BASTARD MORTARS PREPARED AND EXPERIMENTED UPON BY THE BOARD OF THE ALBERT BRIDGE, DRESDEN.

	Proportions of the Mortar-mixture.			Strength in lbs. per sq. inch, English.	
No.	Portland Cement.	Lime.	Sand.	Compressive Value.	Tensile Value.
1	2	1	2	1,422	196
2	2	1	3	1,280	128
3	1	1	1	996	117
4	1	1	2	1,280	124
5	1	1	3	1,138	139
6	1	2	2	213	87
7	1	2	3	213	98
8	1	None.	1	3,414	279
9	1	None.	2	2,703	259
10	1	None.	3	2,579	239
11	1	None.	4	2,205	242

These figures show that the increase of lime reduced the value, while an addition of sand, when the lime was omitted, increased the value of the mortar.

As there is a vast difference in strength between various Portland cements no person using them should neglect to test them thoroughly, the only way of procuring the very best and most reliable, the cheapest because larger proportions of sand can safely be added. Such proceeding would be more profitable than the concoction of illegitimate mortars.

Yours respectfully, GUSTAV GRAWITZ.

THE SEWERAGE OF A SUMMER SETTLEMENT.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Several families are about to establish themselves for summer living on half-acre lots upon a rocky knoll on the seaside. Sewers are impossible; wells are necessary. Is there any better way of guarding against the dangers from contamination, etc., than by turning all drainage, both night-soil and kitchen, etc., into cesspools lined with clay, deodorized by earth, and emptied periodically? Will pits simply stoned be safe in a knoll of granite covered by "drift" and boulders? I am yours, etc.,

T. W.

[WE should wish to be certain that sewers were out of the question before recommending the adoption of a system of drainage so liable to become a nuisance through neglect as that by means of tight cesspools. However, if it is absolutely impossible to conduct waste liquids to lower ground, to be disposed of by irrigation or in other ways, the cesspools form perhaps the best resource for a rocky and uneven situation; but they should be lined with concrete or brickwork in cement. Clay, which can often be used, if of the proper kind, for lining cisterns kept always full, or nearly full, of water, would not do for a cesspool, where it would be dry for a time after the periodical clearing out, and would fail to pieces. The absolute tightness of the cesspools is an *indispensable* condition of safety. If wells are to be sunk anywhere in the neighborhood. Any chance of leakage, by which putrescent sewage might escape from the bottom, and reaching the ledge distribute itself in every direction over and through it, would endanger the whole settlement. This essential once secured, we should advise placing a pump in the cover of each cesspool, by which its contents could be pumped out every morning and used to water the grass. Unless situated very near a house, there would be little or no offence from this operation. The liquid, being comparatively fresh, would have but a slight odor, which the grass would absorb in a few minutes, while a handful of powdered sulphate of iron, thrown into the cesspool before pumping, would remove even that. Deodorization with earth is troublesome, filling up the cesspool with a mass of mud, which must be extracted again with great labor and annoyance, and can be disposed of only with difficulty. We hope our correspondent will on investigation find that a general and pure water-supply can be obtained for the settlement, without having recourse to the dangerous expedient of sinking wells. Judging from our own experience of such work in rocky seaside districts, the aggregate cost of a well for every one or two houses on half-

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acre lots would be considerably greater, if there were a dozen houses or more, than that of supplying them from a reservoir, fed by a wind-mill from a large well at a safe distance. Enamelled iron pipe, at twenty or thirty cents a foot, is a cheap luxury, and there is no need of laying it underground for summer use, if laid so that it can be drained out in the autumn, while the cost of one well, a reservoir, a wind-mill and the street mains are to be balanced against that of a separate well and pump for every half-dozen persons, to say nothing of the other advantages. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Fallacies of Small Test-Pieces. — "The subject of tests for large members of metallic structures is now receiving our earnest attention. If I should speak of its necessity it would only be to repeat what is said in our memorial to Congress. I will only again call attention to one point; that is, that the process of manufacture of a large piece of iron or steel may be so different from that of a small piece, and therefore the quality of the two be so different, though both may be made from the same stock, that the strength of the larger cannot be inferred, but only guessed at, from the known strength of the smaller. In the larger there is more likely to be permanent opposing strains that destroy a large percentage of its strength. A remarkable instance of opposing strains, caused by treatment in manufacture, was pointed out some time ago by Colonel Paine. He found that wire coiled before it was set could not be even straightened without straining the sides beyond the limits of elasticity, and that such wire had nothing near the strength of that coiled straight. As the strength of a large metallic member of a structure cannot be tested by any machine within the reach of individual means, and as to obtain the best results requires the combined skill of several classes of experts, the aid of Congress is invoked to provide a suitable machine and to create a board of experts whose varied skill shall plan the best experiments." —*President Welsh's Address before the Am. Soc. Civil Engineers.*

Replacing an Adjoining Foundation. — In the construction of the new Montauk building on Dearborn Street, now rapidly approaching completion, an ingenious mechanical device was used for the purpose of avoiding a difficulty with which the architects were confronted. The building is, with the exception of the Taylor-street glucose works, the highest in the city, its walls being 132 feet in height, and is of immense weight. Just west of it is the new Crozer building, which has a good wall, but the foundations of which were defective. To build such a heavy structure as was contemplated close beside this would have seriously impaired the adjoining building. It was therefore decided to put a new foundation, identical with that of the Montauk block, under the other building. Screws were placed under the latter, the old foundations removed, and the new one put in. The pressure upon the Montauk foundations where they rest upon the ground is 4,000 pounds to the square foot, and it was calculated that the settlement would be about two inches. In order to prevent danger to the older building, instead of building its wall directly upon the new foundation, screws were placed between the two, so arranged that as fast as the new building and foundation settled the old wall could be kept in line by lengthening the screws. To prevent friction between the two walls building-paper was inserted. Those ingenious devices proved perfectly successful. When the new building is finished the spaces between the screws will be filled in with masonry, and the screws removed. The Montauk block settled uniformly, and the experiment has shown that the highest and heaviest class of buildings can be erected in Chicago without damage to adjoining property. Experimental borings to a depth of sixty feet showed that the subsoil beneath the new building is of one uniform clay. — *Chicago Tribune.*

A Workmen's Republic. — In making the improvements on the Lehigh River, Pennsylvania, in 1817–20, under the charge of Josiah White and Erskine Hazard, eight hundred men were employed at once near Mauch Chunk, then in the wilderness, quite outside the bounds of civilization. It was not easy to control these men, many of whom, doubtless, had never been remarkable for good order. The sheriff of the county was unable to make an arrest; but the fertile genius of Josiah White and the strong good sense of Erskine Hazard soon found a remedy. Under their inspiration the men organized themselves into a republic, adopted a code of laws, which their backwoods poet put into rhyme, and these laws which they themselves had made were strictly enforced and universally submitted to. Punishment was inflicted by a good stout hickory stick as big as your finger, well laid on with a strong arm. The chief executive of this republic, called the lieutenant, was also the executioner. When all hands were called to witness punishment, they said or sang the part of the law which had been transgressed, and the lieutenant beat time on the offender's back. One of the gravest offences was for a man to take more on his plate or his shingle than he could eat. Punishment of this soon stopped the grabbing, and the provision bills were very much reduced. At any official announcement, the expression of loyalty to the supreme authority was not, as in England, "God save the King," or as in Pennsylvania, "God save the Commonwealth," but "Hurrah for Mr. White and all the rest!" — *President Ashbel Welsh, before the Am. Soc. Civil Eng.*

The Tour de Jean-sans-Peur, the sole relic of the Palace of the Dukes of Burgundy, and at the same time the only specimen existing in Paris of military architecture of the fourteenth and fifteenth centuries, is now being restored by the Commission of Historic Monuments. This tower, or rather donjon, which adjoins a communal school in the Rue aux Ours, has been fairly respected during the many building changes that have gone on around it, the only defacement it has suffered being the closing-up of a few windows and the roofing-in of the old crenelated tower. It is now intended to restore this interesting specimen of mediæval architecture to its primitive aspect, with the exception of the side which adjoins the neighboring buildings. — *The Architect.*

A Good Suggestion for Rating the Prices of Bricks. — A correspondent suggests that the market price of bricks should be rated according to their size, weight, and crushing strength. He instances two lots of bricks, sold at the same price per thousand. One lot averaged 2¼" x 3¾" x 7¾" in size, 5 lbs. 2½ oz. in weight, and broke at 5,490 lbs. per square inch. The second lot ran about 2½" x 4" x 8¼" in size, weighed only 4 lbs. 8½ oz., and broke at 3,610 lbs. per square inch. The real values of these two lots of brick were obviously very unequal. As our correspondent says, it makes a vast difference to the builder of arch or pier if he calculates on bricks standing 500 tons to the square foot and gets them half as strong; or if he figures on 4,500 bricks per rod of 306 cubic feet, and it takes 5,500. He thinks that every brick-maker should guarantee a certain size, weight, and crushing strength — which they will probably do when (and not before) builders refuse to purchase bricks which fall short of a stipulated standard of size and quality, or make their contracts with the brick-maker or dealer contingent, as to price, upon the character of the materials delivered. — *Scientific American.*

Remains of a City Discovered Underground in Florida. — For the past six months the work of digging the canal to connect Lakes Eustis and Dora, in order to open up the more southern lakes of the "Great Lake Region of Florida," has been prosecuted. The second cutting of the canal was finished last week under the supervision of Mr. T. H. Sprott, who has been from the commencement one of the foremen on the work. At the outlet of Lake Dora the sand-bar had already been cut to the depth of nearly or quite three feet on the previous digging, and was dug about two feet deeper last week. At a distance of over four feet below the old level of Lake Dora a mound was discovered. The first excavations revealed the existence of a clearly-defined wall lying in a line tending toward the south-west from where it was first struck. This wall was composed of a dark-brown sandstone, very much crumbled in places, but more distinct, more clearly defined, and the stone more solid as the digging increased in depth. The wall was evidently the eastern side of an ancient home or fortification, as the slope of the outer wall was to the west. About eight feet from the slope of the eastern wall a mound of sand was struck, imbedded in the muck formation above and around it. This sand mound was dug into only a few inches, as the depth of the water demanded but a slight increased depth of the channel at that point; but enough was discovered to warrant the belief that here on the northwestern shore of Lake Dora is submerged a city or town or fortification, older by centuries than anything yet discovered in this portion of Florida. Small, curiously-shaped blocks of sandstone, some of them showing traces of fire, pieces of pottery and utensils made of a mottled flint, were thrown out by the men while working waist-deep in water. A spear-head of mottled flint, five and a half inches long by one and a quarter inches wide, nicely finished, is now to be seen at the *Herald* office, which was taken from the top of the sand-mound and about four feet below the water-level of the lake. — *Travers (Fla.) Herald.*

Coloring Wood. — The following process has been patented in Germany by A. Thimm, of Berlin: The wood is covered with solutions of metallic salts by means of a brush or otherwise. It is then left to dry for about twelve hours, and is then taken into an air-tight room, in which gases or vapors are introduced, such as sulphuret of hydrogen, ammonia, etc., according to the tint required to be obtained. By using sulphuret of hydrogen can be thus obtained — *Brown:* Sulphide of bismuth, formed from nitrate of bismuth. *Yellow:* The sulphide of cadmium, formed from solutions of cadmium sulphate. *Gold-Yellow:* Bisulphide of tin, from solutions of chloride of tin. *Iron-Gray to Brown:* Sulphide of lead, from solutions of acetate of lead. *Green:* Oxide of chromium, from solutions of chromic acid. *Red:* Trisulphide of antimony, from antimony solutions. This process is said to be cheap, and the wood can be colored to any design. The colors obtained are not affected by air, light, or water, and can be washed. A very cheap solution of hydroxide of iron in chloride of iron is used to impregnate the wood for floors, stair-treads, and other objects exposed to much wear, and then colored with ammonia. The wood in this case is less apt to burn than when painted in the ordinary way. — *Cabinet Maker and Art Furnisher.*

The Ex-Empress Eugenie *vs.* the City of Marseilles. — The suit brought by the municipality of Marseilles against the ex-Empress of the French has been won by the defendant, who gets a verdict, with costs. The suit was brought in order to recover possession of a large tract of land presented by the city to the Emperor in 1854 as the site for the construction of an imperial palace. In the papers Eugénie was described as "the widow Bonaparte, of no occupation." It was contended that the town gave the land, not to Louis Napoleon personally, but to him as the chief of the State, and that when the empire fell the contract implied in the gift was at an end. The court decided in Eugénie's favor on the following grounds: The gift and its acceptance constituted a contract, the only condition of which was that his Majesty should use the ground and build a palace upon it. This condition was fulfilled to the letter: the palace was reared at the Emperor's personal cost; it had been inhabited, and was still habitable. It was cited, also, that by the Sequestrian Commission appointed on the fall of the empire the land and buildings in question were included among the Emperor's personal property. Before the action was begun, it is said that the ex-Empress spontaneously offered to give the palace and grounds to the city of Marseilles, provided they were employed as an orphanage and school for the children of deceased soldiers. This offer the corporation rejected.

Earthquakes. — In an article on earthquakes in 1881 in *Der Naturforscher*, it is stated that 244 are at present known to have occurred, of which eighty-six were in winter, sixty-one in autumn, fifty-six in spring, and forty-one in summer.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

259,678. EXTENSION-LADDER. — James F. Flint, West Danvers, Mass.

259,702. MACHINE FOR TRIMMING AND CUTTING LUMBER.—Frank McDonough, Eau Claire, Wis.

259,716. HANGING DOOR.—Edwin Prescott, Arlington, Mass.

259,729. APPARATUS FOR VENTILATING AND PURIFYING SEWERS.—James Stratford, Buffalo, N. Y.

259,744. NON-CONDUCTING COVERING FOR STEAM-PIPES, ETC.—Henry C. Bradley, Milwaukee, Wis.

259,762. SAFETY APPARATUS FOR PASSENGER AND OTHER ELEVATORS. — Merrill N. Hutchinson, New York, N. Y.

259,764. JOINT FOR DRAIN AND OTHER PIPES.—Carl Japtok, New York, N. Y.

259,768. ILLUMINATING TILE-PLATE. — William A. Lindsay, New York, N. Y.

259,780. AUTOMATIC SPRINKLER. — Charles W. Tallcott, Woonsocket, R. I.

259,806. HEATING-FURNACE. — George R. Brown, Corning, N. Y.

259,812. CONSTRUCTING BETON OR ARTIFICIAL-STONE CURBING. James Burns, San Antonio, Tex.

259,848. HYDRAULIC ELEVATOR. — Arthur Granville, New York, N. Y.

259,863. MANUFACTURE OF ARTIFICIAL STONE AND MARBLE.—Henry C. Jewell, Georgetown, D.C.

259,890. BRICK-MOULD.—Thomas McNicholas, Memphis, Mo.

259,895. PIPE-TONGS.—Charles H. Miller, Erie, Pa.

259,923. ELEVATOR. — John D. Richardson, New York, N. Y.

259,929. FIREPLACE FENDER. — Isaiah W. Shoemaker, Rosston, Pa.

259,951. SAFETY ATTACHMENT FOR ELEVATORS.—Frederick W. Voerde, Chicago, Ill.

259,985. APPARATUS FOR FLUSHING WATER-CLOSETS.—James P. Hyde, New York, N. Y.

259,986. PROCESS OF AND APPARATUS FOR DRYING LUMBER.—John Lynch, Portland Me.

SUMMARY OF THE WEEK.

Baltimore.

REREDOS.—A memorial reredos has just been erected in the chancel of St. Barnabas' Church, cor. of Biddle St. and Argyle Ave., in memory of the wife of the rector, Rev. A. P. Stryker. It is entirely of oak, and early pointed in style; the design is by J. A. & W. T. Wilson, architects, and was selected in competition.

CENTRAL POLICE STATION-HOUSE. — Additional improvements; cost, $12,500.

Three dwells., for Dr. Eli Henkle, Harlem Ave.; cost, $15,000.

GREEN-HOUSE, Harlem Square; cost, $3,000; Mr. Frank E. Davis, architect.

HOUSE. — Mr. Thos. Hill, real estate broker of this city, has plans prepared for house and barn, which he will erect on large tract of land few miles out of the city; size of house, 40' x 50'; Palliser, Palliser & Co., architects, Bridgeport, Conn.

BUILDING PERMITS. — Since our last report sixteen permits have been granted, the more important of which are as follows: —

Baker, Bro. & Co., two-st'y brick building, 50' x 65', in rear of Ostend St., bet. Eutaw and Warner Sts.

Jacob Hartman, three-st'y brick building, No. 190 Sharp St., bet. Hill and Lee Sts.

Cotton Press Co., one-st'y sheet-iron building, Wells Wharf, foot of Bond St.

Gregory Stenger, two-st'y brick front building, Chase St., bet. Ann and McDonough Sts.

M. Campbell, two-st'y brick stable, Central Ave., n of Bank St.

Wehr, Hobelman & Gottleib, three-st'y brick warehouse, n e cor. Hanover and Conway Sts.

Boston.

CHAPEL. — The First Baptist Society will build a chapel in Commonwealth Ave. in the rear of their church.

BUILDING PERMITS. — *Brick.* — *Mayo St.*, near Castle St., Ward 16, for Boston Building Association, four-st'y tenement-house, 35' 6" x 42'; Albert West, builder.

Pearl St., Nos. 19-21, Ward 12, for R. G. Whitney, four-st'y mercantile, 34' and 39' x 121'; T. J. Whidden & Co., builders.

East Sixth St., cor. of N St., Ward 14, for Henry B. Stratton, three-st'y tenement, 25' x 48'; Henry B. Stratton, builder.

Bromfield St., Nos. 1-3 *and* 5, cor. Washington St., Ward 10, for Alpheus Bigelow heirs, three-st'y iron mercantile, 70' x ——.

Wood. — *Washington St.*, rear of, near Keyes St., Ward 23, for M. Denman Ross, dry-house, 20' x 80'; Wm. Carpenter, builder.

Wakulla St., near Rockland St., Ward 21, for John V. N. Stults, 4 two-st'y dwells., 21' x 50'.

Greenville Pl., near Greenville St., Ward 21, for Wm. Barton, two-st'y dwell., 22' x 34' 6"; ell, 15' 6" x 20' 6"; two-st'y dwell., 26' 6" x 32' 6" and 34' 6"; Wm. Barton, builder.

Webster Ave., near Brighton Ave., Ward 25, Emily J. Frye, two-st'y dwell., 18' and 33' x 51'; two-st'y dwell., 13' and 20' x 51'; Jacob W. Berry, builder.

West First St., opposite F St., Ward 14, for James Evans & Co., storage, 18' x 40'; James Evans & Co., builders.

West Sixth St., near D St., Ward 13, for B. J. Hartigan, two-st'y and mansard dwell., 22' x 40'; James Walsh, builder.

Dorset St., cor. Dorchester Ave., Ward 15, for Richard C. Humphreys, two-st'y dwell., 25' 4" x 29' 8"; George Harding, builder.

West Sixth St., near D St., Ward 13, for Redmond J. Fitzgerald, three-st'y dwell., 22' x 38'; James Walsh, builder.

Culvert St., near Tremont St., Ward 19, for Daniel Sullivan, blacksmith shop, 25' x 50'.

Curtis St., cor. Chaucer St., Ward 1, for Chas. Cooper, dwell., 16' x 26'; Geo. W. Adams, builder.

Temple St., near Centre St., Ward 23, for Holland P. Myers, two-st'y dwell., 25' 8" and 32' 8" x 45'; Wood & Weatherbee, builders.

K St., No. 219, cor. Tenth St., Ward 14, for Arthur Deady, greenhouse, 13' x 60'; Arthur Deady, builder.

Lamartine St., rear of, near Green St., Ward 23, for Louis H. Mahn, manufacturing and wagon house, 16' x 32'; John Albrecht & Co., builders.

Park St., near Felton St., Ward 23, for Horace Farrington, two-st'y dwell., 21' and 25' x 30'; Geo. A. Spear.

Maple St., rear of, cor. Schuyler St., Ward 21, for James A. Houston, 2 greenhouses, 18' x 70' and 25' x 70'; McNeil Bros., builders.

Brooklyn.

GOVERNMENT BUILDING.—The Senate Committee on Public Buildings and Grounds will report favorably the House Bill appropriating $800,000 for a public building.

MONUMENT.—The Aldermanic Committee on Public Lands and Buildings has decided to report in favor of requesting the Board of Estimate to insert $25,000 in the tax budget for a monument for the soldiers and sailors.

BUILDING PERMITS. — *Hooper St.*, s s, 206' e Lee Ave., 3 three-st'y brownstone dwells.; cost, $10,000 each; owner, architect and builder, John F. Ryan, 187 Hewes St.

Jefferson St., s s, 400' w Bushwick Boulevard, two-and-one-half-st'y frame dwell.; cost, $4,000; owner, H. Oberhauser, North Twelfth St., near First St.; architect, John Platte; builders, Jacob Rauth and F. J. Berlenbach.

Graham Ave., n w cor. Seigel St., 2 four-st'y frame stores and tenements; cost, $5,500 each; owner, John Henry, Graham Ave., near Seigel St.; architect, John Platte; builders, Wm. Dafeldecker and John Rueger.

Quincy St., s s, 300' w Sumner Ave., three-st'y brick dwell.; cost, $3,000; owner, W. O. Thompson, cor. Putnam Ave. and Irving Pl.; architect, O. D. Thompson.

Twentieth St., s s, 125' w Sixth Ave., to Twenty-first St., 4 three-st'y frame houses; cost, $3,000 each; owner, architect and builder, James W. Wandell, Forty-ninth St., e of Third Ave.

Floyd St., Nos. 337 *and* 339, n s, 91' w Lewis Ave., two-st'y frame dwell.; cost, $3,000; owner and builder, Geo. Leoffler, 82 Tompkins Ave.; architect, Theo. Engelhardt.

Conover St., w s, 70' from Partition St., three-st'y brick store and tenement; cost, $4,000; owner, A. Anderson, 212 Conover St.; architect, Jno. J. Kelley; builders, Peter Kelly & Son and Gierson & Siebrand.

Lefferts Pl., n w cor. Clason Ave., 3 four-st'y dwells., corner house brick, others brownstone; cost, $10,000 each; owner and builder, Andrew Miller, 1527 Pacific St.; architect, Amzi Hill.

Lee Ave., s w cor. Heyward St., three-st'y brick store and dwell.; cost, $10,500; owner and builder, Richard Healy; architect, J. D. Reynolds.

Lee Ave., w s, 25' s Heyward St., 4 two-st'y brick dwells.; cost, $4,300 each; owner and builder, Richard Healy; architect, J. D. Reynolds.

Boerum St., s s, 225' w Bushwick Ave., 2 three-st'y frame dwells.; cost, $8,500; owner, L. Cronnenwerth, Boerum St.; builders, Wm. Bayer and M. Metzen.

Congress St., s s, between Hicks and Columbia St., one and two st'y brick office and shed; cost, $6,000; owner, J. P. Robinson, 6 Montague Terrace; architect, H. Turner; builders, D. Heavy and —— De Witt.

Monroe St., n s, 365' e Lewis Ave., 3 two-st'y brownstone dwells.; cost, $5,000; owner, W. J. C. Miller, 299 Sumner Ave.

Central Ave., s e cor. Jefferson St., 2 three-st'y brick stores and tenements; cost, each, $6,500; owner, L. Eppig, Central Ave., near George St.; architect, J. Platte; builder, J. Zwing.

ALTERATIONS. — *North Second St., No.* 316, disconnect extension from main building and raise it two stories; cost, $3,500; owner, Charles Kinken, on premises; architect, E. F. Gaylor; mason, John McQuade.

Livingston St., No. 99, raise one st'y; cost, $5,000; owner, Polytechnic Institute, on premises; architect, J. Correja; builders, J. De Mott & Son and W. H. Noe.

Remsen St., No. 58, two-st'y brick extension; cost, $3,000; owner, Wm. G. Low, on premises; architects, Parfitt Bros.; builder, T. W. Rollins.

Chicago.

CHURCH.—The corner-stone of St. Stephen's A. M. E. Church was laid June 25.

HOUSES IN PROSPECT.—On Michigan Ave., s of Thirty-fifth St., a fine two-st'y stone front residence, 52' x 68', for Mr. L. T. Rosenthall, to cost $60,000, is to be built; Mr. W. H. Esterham, architect.

On the cor. of Centre and Hurlburt Sts., 7 apartment houses, containing apartments for 21 families; pressed brick and stone front, 65' x 173', to cost $40,000; Mr. J. H. Johnson, owner; Mr. C. O. Hausen, architect.

BUILDING PERMITS.—Henry Dreckschmidt, two-st'y and basement brick dwell., 22' x 48', 449 W. Twelfth St.; cost, $4,000.

C. W. Pardridge, 5 two-st'y and basement brick dwell., 40' x 80', cor. Thirty-seventh St. and Stanton Ave.; cost, $10,000.

J. Bruzek, two-st'y and basement brick store and dwell., 21' x 70', 1117 Blue Island Ave.; cost, $5,000.

B. P. Moulton, two-st'y basement and attic brick dwell., 45' x 80', 1912 Prairie Ave.; cost, $75,000; Treat & Folz, architects.

F. J. Dewes, brewery and ice-house, 76' x 113', cor. Chicago and Hoyne Aves.; cost, $30,000.

M. D. Miller, three-st'y brick dwell., 22' x 60', 198 Ontario St.; cost, $6,500.

P. O'Malley, two-st'y basement and attic brick dwell., 22' x 66', 117 Erie St.; cost, $4,000.

Mrs. J. M. M. Cooper, two-st'y and basement brick dwell., 24' x 34', 2552 Groveland Park Ave.; cost, $2,600.

D. T. Sunderland, two-st'y and basement brick dwell., 21' x 56', 2967 South Park Ave.; cost, $5,000.

Wm. Becker, two-st'y and basement brick dwell., 22' x 45', 3741 Dearborn St.; cost, $3,100.

Amelia Lehman, two-st'y brick dwell., 25' x 62', 227 Loomis St.; cost, $3,000.

Jos. McComb, two-st'y brick dwell., 23' x 50', 534 Hurlburt St.; cost, $3,500.

M. D. Ewart, four-st'y and basement brick factory, 50' x 178, 11 to 23 South Jefferson St.; cost, $40,000.

John A. Courcy, two-st'y and cellar brick flats, 21' x 64', 45 Newberry St.; cost, $4,500.

Wm. Brown, two-st'y brick dwell., 40' x 57', 127 and 129 Wilcox St.; cost, $5,500.

D. Sincear, two-st'y and basement brick dwell., 24' x 65', Wabash Ave., near Thirtieth St.; cost, $5,000.

Max Weineman, three-st'y brick dwell., 40' x 68', 2544 Michigan Ave.; cost, $30,000.

John Pausch, two-st'y and basement brick dwell., 22' x 56', 654 West Eighteenth St.; cost, $3,000.

C. Gruenewald, two-st'y and basement brick dwell., 28' x 60', 740 Sedgwick St.; cost, $8,000.

M. Haugh, two-st'y brick dwell., 22' x 60', 2812 Bonfield St.; cost, $4,000.

John Turnbole, two-st'y and basement brick dwell, 24' x 46'. 516 W. Jackson St.; cost, $6,000.

Wm. Burke, two-st'y and basement brick dwell., 22' x 68', 356 Fourteenth St.; cost, $4,000.

John King, three-st'y and basement store and dwell., 23' x 80', 426 Milwaukee Ave.; cost, $7,000.

Karsberg & Rinn, three-st'y planing mill, 76' x 112', Crosby, near Division St.; cost, $15,000.

John Reitz, two-st'y store and dwell., 23' x 75', 750 Twenty-second St.; cost, $5,600.

D. Harry Hammer, 4 three-st'y brick stores and dwells., 62' x 96', State and Thirty-sixth St.; cost, $30,000.

Bemis & McAvoy, six-st'y brick brewery, 60' x 138', S. Park Ave., near Twenty-fourth St.; cost, $80,000.

T. A. Hoffmeyer, two-st'y and basement brick dwell., 24' x 54', 258 Market St.; cost, $4,800.

Cincinnati.

INFIRMARY BUILDING.—The city infirmary is to have a large addition built to it this summer, costing abt. $35,000; Mr. E. Anderson is the architect in charge of the work.

WAREHOUSE. — J. F. Elliott is building a five-st'y wareheuse on Freeman Ave. and railroad, for the Singer Sewing Machine Co.; cost, $16,000; S. E. Des Jardins, architect.

BUILDING PERMITS. — Since our last report the following permits have been issued: —

S. L. Wilder, four-st'y brick dwell., Sixth St., between Elm and Plum Sts.; cost, $15,000.

H. Ketterer, one-st'y brick dwell., Browne St., near Freeman Ave ; cost, $2,200.

M. Fricker, three-st'y brick dwell., cor. of Baymiller and Gest Sts.: cost, $2,000.

J. W. Miller, repair five-st'y brick dwell., Seventh St., between Main and Walnut Sts.; cost, $2,500.

Dr. T. W. Gradon, 2 two-st'y frame dwells., Kemper Lane and Nassau St.; cost, $6,000.

Henry Oliver, three-st'y brick dwell., n e cor. Wade and Jones Sts.; cost, $6,400.

C. M. Murch, two-st'y brick dwell., George St., between Central Ave. and John St.; cost, $2,500.

Mrs. M. Shon, two-st'y brick dwell., Cross St., near Hamburg St.; cost, $2,500.

Henry Allen, three-st'y brick dwell., Hopkins St., e of Dalton Ave.; cost, $5,000.

Jno. Stafford, two-st'y frame dwell., Price Ave., near Summit Ave.; cost, $6,000.

Stephen Gibson, two-st'y brick dwell., Park Ave., between Warsaw and Price Ave.; cost, $3,500.

Mrs. G. H. Koeffer, three-st'y brick dwell., cor. of Cutter and Wade Sts.; cost, $3,500.

Albert Young, 3 four-st'y brick dwells., Liberty and Jones Sts.; cost, $15,000.

Mrs. R. Lohle, two-st'y brick dwell., Purcell Ave., near Warsaw Pike; cost, $3,500.

John Shott, two-st'y brick dwell., s w cor. James and Fifth Sts.; cost, $9,000.

Peter Aumba, two-st'y brick dwell., Milton St.; cost, $3,600.

A. Strefel, two-st'y dwell., Spring Grove Ave.; cost, $7,000.

John Janson, Sr., three-st'y brick dwell., 13 Mulberry St.; cost, $4,000.

John Kabell, two-st'y brick, on Cross St.; cost, $2,000.

Jos. Witz, two-st'y brick, Neave St., near Gennon St.; cost, $2,000.

Andrew Schneider, three-st'y brick, 193 Barr St.; cost, $5,000.

Lewis Coleman, three-st'y brick, Denman St., bet. Liberty and Wade Sts.; cost, $3,000.

Fred. Groneman, three-st'y brick, State Ave. near Gest; cost, $3,500.

Twenty-six permits for repairs; cost, $10,400.

Detroit.

BUILDING PERMITS.—112 permits have been granted during the three weeks ending June 24, amounting to $335,055.

Those costing $3,000 and over are as follows: —

Nuppenan & Clark, brick store, Shelly St.; cost, $3,000.

Stone dwell., on Woodward Ave., to cost $28,000; W. Scott & Co., architects.

Brick dwell. on Third St., to cost $3,500, Mason & Rice, architects.

Brick dwell. on Howard St., to cost $13,000; Mason & Rice, architects.

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Alexandrine St., brick barn; cost, $3,800; owner; S. A. Buchanan.

Brick barn, 142 W. Fort St., to cost $6,000; owner, Gen. Alger; contractors, Nuppenan & Clark.

Brick dwell., 37 and 39 Abbott St.; cost, $6,000; J. V. Smith, architect.

Brick dwell., E. Columbia St.; cost, $5,000; J. V. Smith, architect.

Fourth St., frame dwell; cost, $4,500; owner, J. S. Martin.

Brick photograph gallery, Williams St.; cost, $13,000; contractors, W. E. Armstrong & Co.

Repairs to flouring mill on Woodbridge St.; cost, $9,000; owner, W. H. Faxon.

Campau Block, cor. of Larned and Griswold Sts.; cost, $120,000; contractors, A. Chapoton and Nuppenan & Clark; architects, Smith & Browne.

Brick shed and office on W. Woodbridge St.; cost, $5,000; owner, F. Page.

2 brick dwells., Nos. 641 and 643 Cass Ave.; cost, $9,000; owners, McEnhill & Moore.

Brick dwell., No. 579 Cass Ave.; cost, $4,000; P. A. Keeler.

Frame dwell. on Second St.; cost, $6,000; owner, Thomas Payne.

Brick dwell. on Jay St.; cost, $6,500; owners, Caspar Waeshewald & Co.

Brick planing mill on Croghan St.; cost, $7,000; owners, Baker & Shefferly.

Brick dwell., 36 Macomb St.; cost, $5,000; architect, Julius Hess.

Additions and alterations to brick brewery on W. Woodbridge St.; cost, $10,000; owner, Patrick Dee.

New York.

FACTORY.—A brick factory, 50′ x 85′, six-st'y, is to be built for Messrs. F. W. Devoe & Co., at the corner of Horatio St. and Jane St., to cost, $25,000; Messrs. Kimball & Wisedell are the architects.

FLATS.—For Messrs. Jno. D. Crimmins & Co., 5 flats, five-st'y, to cover a lot 100′ x 108′ 6″ are to be built on Ninth Ave., cor. Ninety-second St. They are to be of brownstone and Philadelphia brick, and will cost about $90,000; Messrs. D. & J. Jardine are the architects.

RESIDENCE.—For Mr. Jas. Britt, a frame dwell. is to be built on One Hundred and Fifty-second St., near Twelfth Ave.; Messrs. D. & J. Jardine are the architects.

ALTERATIONS.—An extension is to be made to the residence of Mr. Wm. Bryce, No. 49 W Fifty-fourth St.; from designs of Messrs. D. & J. Jardine.

BUILDING PERMITS. — *Seventy-third St.*, s s, 80′ e Lexington Ave., two-st'y brick stable and carriage-house; cost, $60,000; owner, Robert L. Stuart, 151 Fifth Ave.; architect, William Schickel; mason, Marc Eidlitz.

Second Ave., n e cor. Seventy-first St., four-st'y brownstone store and apartment-house; cost, $20,000; owner, John C. Burne, 1531 Third Ave.; builders, Chenoweth & Bannon.

Second Ave., e s, 77′ 2″ n Seventy-first St., four-st'y brownstone store and tenement; cost, $16,500; owner and builders, same as last.

Second Ave., e s, 27′ 2″ n Seventy-first St., 2 four-st'y brownstone stores and tenements; cost, each, $16,500; owner and builders, same as last.

Avenue A, w s, 50′ n Ninety-first St., two-st'y brownstone dwell.; cost, $4,000; owner, Thos. Osborne, East Eighty-ninth St.; architect, John Brandt.

Ninety-seventh St., s s, 100′ w Second Ave., 8 four-st'y brick and stone tenements; cost, each, $15,000; owner, Samuel Simmons, 13 Sheriff St.; architect, Chas. Baxter; builder, M. J. Daly.

Madison Ave., n e cor. One Hundred and Twenty-first St., one-st'y brick and Corsehill stone church; cost, $45,000; owner, Trustees Harlem Congregational Church, T. M. Timpson, Franklin Ave., near One Hundred and Sixty-ninth St.; architect, L. B. Valk; builders, T. W. Rollins and V. Losee.

Fourth Ave., w s, from Sixty-ninth to Seventieth St., six-st'y brick and stone seminary; cost, $262,000; owner, Union Theological Seminary, New York; E. M. Kingsley, Treasurer, 25 East Sixty-third St.; architects, W. A. Potter and J. B. Lord; builders, Robert L. Darragh & Co.

ALTERATIONS.—*Roosevelt St., No.* 15, building taken down to top of first story and rebuilt five st'y; also five-st'y brick extension: cost, $11,850; owner, Howard Conkling, exr. of estate of E. R. Conkling, 27 East Tenth or 3 Mercer St.; architect, B. McGurck.

East Thirteenth St., No. 115, rear, altered internally, etc.; cost, $2,500; owners, F. Grote & Co., 114 East Fourteenth St.; architect, L.A. Risse; builders, Vix & Son.

Madison Ave., No. 31, four-st'y brick extension; cost, $2,500; owner, Jeremiah W. Dimick, 6 East Forty-first St.; architect and builder, J. H. Whitenack.

West Nineteenth St., No. 1, cor. Fifth Ave., three-st'y brick extension; cost, $10,000; owner, Henry Parish, on premises; architect, D. Lienau; builder, L. H. Williams.

East Forty-fifth St., No. 21, three-st'y brick extension; cost, $2,500; owner, Mrs. S. J. Strong, by A. G. Hyde, att'y, 21 East Forty-fifth St.; builders, Sinclair & Wills.

West Fifty-second St., No. 38, interior alterations, etc.: cost, $3,000; owner, T. G. Strong, 41 Wall St.; architects, J. C. Cady & Co.; builders, Sinclair & Wills and Smith & Bell.

State St., Nos. 11 *and* 13, raised 9′, five-st'y brick extensions and internal alterations; cost, $20,000; owner, George F. Johnson, 148 East Thirty-fourth St.; architect, A. B. Ogden; builders, D. & E. Herbert.

Fifth Ave., s e cor. Twenty-ninth St., four-st'y brick extension, front and interior alterations; cost, $8,000; lessee, Daniel Neumann, 300 West Forty-second St., of Neuman & Co., 263 Fifth Ave.; architects, H. J. Schwarzman & Co.; builders, List & Lennon and T. J. Duffy.

Broadway, No. 747, through to No. 12 Neilson Pl., repair damage by fire; cost, $3,983; owner, James M. Varnum, 173 Fifth Ave.; builder, E. Smith.

Fourth Ave., No. 77, two-st'y brick extension; cost, about $2,000; owner, Jas. H. Drake, on premises; builders, G. D. Hilyard and J. L. Smith.

East Seventeenth St., No. 15, two and three st'y brick extensions; cost, $6,000; owner, Vincent Vigouroux, on premises; builder, J. W. Crawford.

East Thirty-fourth St., No. 129, two st'y brick extensions; cost, $2,000; owner, Laura H. Curtis, 129 East Thirty-fourth St.; architect, H. R. Marshall.

Henry St., Nos. 137 *and* 139, to be made of same height; cost, $4,500; owner, Harriet L. Leonard, in behalf of Trustees of Ursuline Convent, 139 Henry St.; architect, L. J. O'Connor; builders, J. Rooney and M. J. Newman.

West Thirty-fifth St., Nos. 322 *to* 330, raised two stories; cost, $2,500; owner, Decker Bros., 33 Union Sq.; architect, G. P. Pelham, builders, Van Dolsen & Arnott and Jeans & Taylor.

Fifty-sixth St., n s, 200′ w First Ave., three-st'y brick extension; cost, $8,000; owner, Walter Schriver, 185 East Seventy-first St.; architect, A. B. Ogden, builder, Geo. Dollinger.

Sixth Ave., No. 879, one-st'y brick extension; cost, $4,000; owner, Alexander Kuh, 102 West Fiftieth St.; architect, J. B. Franklin.

West Ninth Ave., No. 363, n e cor. Twenty-eighth St., one-st'y brick, glass and iron extension; cost, $3,000; owner, Nathalie E. Baylies, on premises; architects, Hamilton & Pistor.

University Pl., No. 8, first-st'y partitions removed, new store front and rear wall altered; cost, $5,000; owner, John A. Hadden, 46 West Twentieth St.; architects, Wm. Field & Son; builder, J. Keleher.

West Thirty-ninth St., No. 54, add one st'y to extension, front altered, etc.; cost, $8,500; owner, Geo. Bliss, 54 West Thirty-ninth St.; architect, Jas. O'Hara; builder, Geo. Mulligan.

Fifth Ave., n w cor. One Hundred and Twenty-sixth St., roof raised and made peaked; also two extensions; cost, $25,000; owner, Lucien C. Warner, 372 Broadway; architect, A. B. Jenning; builders, —— White and E. Gridley.

Sixth Ave., No. 517, *and West Thirty-first St., No.* 100, one-st'y brick extension, front and interior alterations; cost, $3,500; attorney for owner, John R. Platt, 265 Broadway; architect, O. S. Teale.

Bridge St., No. 3, interior strengthened and plastered; cost, $3,000; owner, American Emigration Co., 16 State St.; builders, J. B. Smith, Prodgers & Co., and Morton & Chesley.

Philadelphia.

FACTORIES. — Messrs. Folwell Bros. & Co. propose erecting on Third, Cambria and American Sts. the following manufacturing buildings: main building, five-st'y, 47′ x 400′; one-st'y weave shed, 189′ x 198′; (two-st'y dye-house, 80′ x 180′, saw-tooth roof, second st'y for manufacturing purposes) boiler-house, 40′ x 82′; engine-room, 16′ x 64′, all of brick; J. F. Stuckert, architect.

HOSPITAL-BUILDING. — A two-st'y clinic hall is being erected for the women's hospital, on North College Ave., to be of brick and brownstone, 54′ x 60′, with amphitheatre for 250 students.

BUILDING PERMITS. — *Walnut St., No.* 1300, front alteration and three-st'y brick building, 20′ x 68′; J. S. Wilson, contractor.

St. John St., s w cor. Willow St., fifth-st'y addition to tannery, 40′ x 100′; Jas. McCartney, contractor.

Cherry St., No. 2305, two-st'y addition to factory, 31′ x 100′; Townsend, Wilson & Hubbard, owners.

Church St., near Hamilton St., three-st'y addition to factory, 45′ x 50′; Stafford & Co., owners.

Maplewood St., n w cor. Green St., 2 three-st'y dwells., 20′ x 56′; E. McDermond, contractor.

Queen St., e s, s of Green St., 3 three-st'y dwells., 15′ x 44′; E. McDermond, contractor.

Fifth St., w s, n of Snyder Ave., 2 two-st'y dwells., 16′ x 42′; O. P. F. Fisher, contractor.

Mascher St., e s, n of Huntingdon St., 6 two-st'y dwells., 12′ x 28′; Chas. Bassert, contractor.

Sepviva St., No. 242, three-st'y dwell., 18′ x 42′; Jas. Crook, owner.

Willow St., e s, n of Harrison St., 2 two-st'y dwells., 16′ x 44′; Jno. Shuttleworth, owner.

C St., s e cor. Somerset St., 7 two-st'y dwells., 16′ x 38′; J. M. Peters, owner.

Hedley St., s s, between Indiana Ave. and Hart Lane, 2 two-st'y dwells., 13′ x 28′; J. M. Peters, owner.

Eighteenth St., s e cor. Brandywine St., three-st'y stable, 25′ x 40′; A. A. Campbell, contractor.

Woodstock St., e s, between Brown and Parrish Sts., 20 three st'y dwells., 17′ x 52′; Jno. McGill, owner.

Cumberland St., n w cor. Leithgow St., three-st'y store and dwell., 18′ x 47′; W. Bartholomew.

Fifteenth St., s e cor. Mt. Vernon St., two-st'y school-building, 58′ x 80′; A. H. Williams, contractor.

St. Louis.

BUILDING PERMITS.—Fifty-eight permits have been issued since our last report, but eleven of which are for unimportant frame houses. Of the rest those worth $2,500 and over are as follows: —

Mrs. C. Roentgen, one-and-one-half-st'y; cost $3,000.

B. W. Lewis, 12 two-st'y tenement-houses; cost, $12,000.

Henry Boening, 2 two-st'y dwells ; cost, $7,600.

Peter Rick, 2 two-st'y dwells.; cost, $3,900.

—— Cary, 2 two-st'y dwells.; cost, $6,000.

F. H. Logemann, four-st'y factory; cost, $1,600.

St. Stanislaus Church, church; cost, $13,000.

Adolphe Busch, two-st'y dwell.; cost, $4,000.

Anhenser-Busch Brewing Association, one-st'y warehouse: cost, $4,000.

Excelsior Brewing Co., one-st'y bottling-house; cost, $2,500.

Mallinkrodt Chemical Works, one-st'y chemical works; cost, $3,500.

Geo. M. Roeder, dwell.; cost, $3,000.

Wm. Klasking, two-st'y dwell.; cost, $3,800.

Mrs. Watkins, two st'y dwell.; cost, $3,780.

Mrs. Gausey, 2 two-st'y dwells.; cost $3,000.

J. Weinert, two-st'y dwell.; cost, $6,800.

Sophia Kern, two-st'y store and dwell.; cost, $2,500.

H. H. Witte, three-st'y dwell.; cost, $2,900.

H. Danes, two-st'y dwell.; cost, $3,000.

Anhenser-Busch Brewing Association, frame, grain elevator; cost, $25,000.

Washington, D. C.

BUILDING PERMITS.—The following are the permits issued since last report: —

Mrs. M. Read, brick dwell., 22′ 9″ x 52′, three-st'y and cellar, Nineteenth, bet. N and Dupont Circle, n w; cost, $10,000.

J. T. Stevens, brick dwell., 24′ 10″ x 50′ 7″, three-st'y and basement, N. J. Ave., bet. B and C, s e; cost, $18,000.

G. F. Graham, 2 brick dwells., 16′ 8″ x 35′, two-st'y and cellar, Kingman, bet. Thirteenth and Fourteenth Sts., n w; cost, $3,200.

R. Stead, 2 brick dwells., 19′ x 47′, three-st'y and basement, Seventeenth, bet. R. I. Ave. and N Sts., n w; cost, $16,000.

Helen R. Tindall, frame dwell., 22′ x 32′, two-st'y county; cost, $2,000.

Ed. Temple, 3 brick dwells., 16′ x 32′, two-st'y and cellar, Tenth and Va. Ave., s w; cost, $6,500.

Laurence Sands, brick dwell., 21′ 8″ x 33′, three-st'y and basement, near cor. R and Nineteenth Sts., n w; cost, $3,500.

W. E. Prall, brick dwell., 40′ x 50′, three-st'y and basement, Sixteenth, bet. I and K, n w; cost, $35,000.

G. W. Uttermuhle, 2 brick dwells., 12′ 6″ x 42′, two-st'y and basement, Fourteenth, bet. P and Q Sts., n w; cost, $2,500.

Thos. E. Waggerman, 3 brick dwells., 15′ 9″ x 28′, two-st'y and cellar, F, bet. Twenty-first and Twenty-second Sts., n w; cost, $5,000.

Hannah Engle, 2 brick dwells., 18′ x 36′, two-st'y and basement, Second, bet. C and D, n e; cost, $5,000.

D. B. Groff, 2 brick dwells., 19′ x 44′, two-st'y, Eleventh bet. T and U, n w; cost, $4,000.

Rudolf Goldsmith, 4 brick dwells., 18′ x 33′, three-st'y and cellar, Mass. Ave. and H, n w; cost, $11,000.

E. C. Halliday, 2 brick dwells., 25′ x 34′, three-st'y and basement, N, bet. Eighteenth and Nineteenth, n w; cost, $14,000.

Riggs & Co., rebuild rear wall and make repairs at 1326 Seventh, n w; cost, $2,000.

Mrs. S. S. Kall, remodel and repair at 728 Seventeenth St., n w; cost, $3,000.

John Sherman & Co., 2 brick dwells., 43′ x 45′, three-st'y and basement, Mass. Ave., near Fourteenth St., n w; cost, $16,000.

Henry Stopsack, brick dwell., 20′ x 38′, two-st'y and cellar, Pa. Ave., bet. Sixth and Seventh, s e; cost, $2,500.

R. C. Johnson, brick dwell., 40′ x 52′, three-st'y and basement, I, bet. Seventeenth and Eighteenth, n w; cost, $20,000.

Daniel Murray, 3 brick dwells., 17′ 6″ x 36′, three-st'y and basement, Twelfth, bet. N and O, n w; cost, $7,500.

Smith Pettit, brick dwell., 18′ x 2[illegible]′, two-st'y and basement, 1822 Fifteenth St., n w; cost, $3,800.

A. F. Barker, 2 brick dwells., 20′ x 26′, two-st'y and cellar, B, bet. Ninth and Tenth, s w; cost, $7,500.

L. C. Bailey, brick dwell., 18′ 8″ x 34′, two-st'y and basement, Eighteenth, bet. L and M, n w; cost, $2,600.

General Notes.

BANGOR, ME. — Two-st'y frame house, 38′ x 40′, eight rooms, for W. L. Morse; Palliser, Palliser & Co., architects, Bridgeport, Conn.

JEWETT CITY, CONN. — Mr. Geo. H. Jennings is building for himself a house and barn: cost, about $2,500; Palliser, Palliser & Co., architects, Bridgeport, Conn.

LAKE MAHOPAC, N. Y. — Cottage, 20′ x 30′, building by Sela Buckbee: plans by Palliser, Palliser & Co., architects, Bridgeport, Conn.

NEW HAVEN, CONN. — Plans were received by Armory Commission, June 21, for building, 111′ x 270′: cost, $38,000. The principal architects in the State were invited to compete.

STOUGHTON, MASS.—Messrs. Lamb & Stanton have the contract for building the dwell. for Henry H. Davis, on Elm St.

WATRONSVILLE, MICH. — W. L. King is to greatly change his house; plans by Palliser, Palliser & Co., architects, Bridgeport, Conn.

Industrial.

BROCKTON, MASS. — F. E. White will make extensive additions to his factory.

CEDAR RAPIDS, IOWA. — The Harvester Works contemplate several new buildings, at a cost of $25,000.

CHAMBERSBURG, PA. — The Taylor Locomotive Company has begun work on its new buildings.

COLERAINE, MASS. — Shattuck's cotton mill is to be enlarged by an addition, 12′ x 18′.

CRAGIN, ILL. — Cragin Bros. & Company, of Chicago, will soon build two frame buildings, each 50′ x 80′; also a two-st'y brick building, 96′ x 200′.

FRANKFORD, PA. — The Frankford Boiler-Works is making an addition, 45′ x 70′.

GARFIELD, ILL. — The Washburn & Moen Manufacturing Company will soon build a large warehouse upon the large tract of land recently purchased by them.

The Garfield Locomotive Works, with a capital of $500,000, will build at once, machine-shop, 83′ x 453′; foundry, 82′ x 200′; blacksmith shop, 52′ x 200′.

GLEN MILLS, PA. — Additions will soon be made to Wilcox & Company's paper mill.

HOLYOKE, MASS. — The Worthington & Judd Paper Company will enlarge its works.

LEBANON, PA. — The Pennsylvania Bolt and Nut Works will build the following buildings: a rolling-mill, 60′ x 120′; nut and bolt factory, 80′ x 120′; boiler-house, 30′ x 40′; burring-room, 40′ x 60′, machine-shop, 60′ x 120′; warehouse, 50′ x 150′.

MARQUETTE, MICH. — The Iron Bay Foundry is building a boiler-shop, 45′ x 90′.

MATTEAWAN, N. Y. — H. B. Schenck is about to enlarge his machine-works by a foundry, 40′ x 70′, a machine-shop, 50′ x 150′, and a pattern-room, 40′ x 40′.

MIDDLETOWN, N. Y. — Large additions are about to be made to the Orange County Furnace and Machine Shop.

SANDY HILL, N. Y. — The Iron and Brass Works Company are building a foundry, 32′ x 70′; also a machine-shop, 40′ x 100′.

(*Continued in Supplement, page* 3.)

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & CO. No. 341.

JULY 8, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE suit of certain owners of real estate to prevent the removal of the reservoir at Fifth Avenue and Forty-second Street, New York, has been heard recently in the Supreme Court of that State. At the opening of the hearing, according to the report of the New York *Times*, evidence was offered by the plaintiffs showing that the Board of Aldermen of the city had passed a resolution expressing their official desire to have the reservoir left standing, and instructing the Corporation Counsel to withdraw the answer he had made to the complaint of the plaintiffs. Upon this the Corporation Counsel, or rather, his assistant for him, who appeared in the ranks of those defending the movement to pull the structure down, replied that the Corporation Counsel was not subject to the orders of the Aldermen respecting the course he should take in conducting litigation, and the judge, in accordance with this view, refused to admit the evidence. The non-legal mind may possibly inquire what use a Corporation Counsel is to a city which has no right to tell him what side to take in cases affecting its inhabitants, but these are questions into which we do not venture to enter. In regard to the value of the reservoir in its present position the evidence presented was conflicting. Mr. Allan Campbell, the late Commissioner of Public Works, now Comptroller, and Mr. Birdsall, a well-known engineer in the Croton Water Bureau, expressed the opinion that the reservoir was unnecessary, and that its demolition would not affect the efficiency of the city water-supply. On the contrary, Mr. Jervis, the distinguished engineer of the Croton aqueduct, testified that he should consider it wrong to remove the reservoir: that in its absence the city would be exposed to danger through a short supply of water, and it might be found impossible without it to combat great fires successfully. Opinions to the same effect were offered by Mr. Bates, Chief Engineer of the Fire Department, Mr. B. S. Church, like Mr. Birdsall an engineer of the Croton Water Bureau, Mr. Edmund Driggs, President of the Williamsburgh Fire Insurance Company, who spoke in behalf of the Board of Underwriters, and General Isaac Newton, the present Chief Engineer of the Croton Aqueduct Bureau, whose judgment is perhaps of as much value as that of any other of the witnesses. Considering the questionable advantage to be gained by pulling the building down, it certainly seems a pity to remove any possible safeguard against the occurrence of the disastrous fires which are sure to come sooner or later. In its present condition the reservoir is not only a picturesque but a beautiful object, covered as it is with vines, and surrounded with terraces of bright flowers. Its dark mass, although extensive enough to have a certain grandeur of effect, is low, and does not cut off light or air of any value, while it serves to separate Fifth Avenue and the dust, noise and smoke of Sixth Avenue by a screen whose destruction would take away a considerable part of the charm of the place, and reduce it to the common level of city squares.

MR. JOHN COWDON, an experienced navigator of steamboats on the Mississippi River, has prepared a plan for preventing inundations in the valley of that stream by making a new outlet from the river to the sea, through a canal to be cut from a point on the present channel, about ten miles below New Orleans, to Lake Borgne, whence the water would find an outlet to the Gulf by a short course. The rapid discharge afforded by this outlet would, he thinks, obviate the accumulation of water in the channel, and the inundations which come in consequence, and the cost would be trifling compared with that of the levee system which is now in contemplation. The first estimate of cost for the Lake Borgne outlet was, we believe, about two hundred thousand dollars, but this probably did not include compensation for the land to be taken for its construction, and the proposition now made, and brought before Congress in an amendment to the River and Harbor Bill, is that one million dollars shall be paid Mr. Cowdon for the whole work, including expenses of every kind, the payment to be conditional on the actual lowering of the flood-line of the river at New Orleans to a point four feet below its present level, but instalments to be paid on account at the rate of a quarter of a million for every foot of lowering.

A NEW element is perhaps likely to be introduced into the question of improvement of the Mississippi by a consideration which is suggested in a remark said to have been made by a planter whose land was flooded by the recent inundations, — that the silt deposited by the water had proved so fertilizing in its effect that his gains in the crops of this year promised to offset the pecuniary loss which he had suffered from the flood. We do not know whether other proprietors have observed the same effect, but it is one which, if it is really found to exist, must be regarded as of the highest importance. We have always before us the example of the valley of the Nile, which, nourished by annual floods, has maintained its wonderful productiveness for unknown centuries, and, reasoning from analogy, there is every reason to believe that the Mississippi silt, if properly directed, might serve to retain in perennial fertility a vast area of land whose productiveness is now being either rapidly consumed, or maintained by the use of costly manures. The desolate fields of many parts of modern Virginia, which a century ago were so rich and flourishing, bear witness to the exhausting character of southern farming, and if the Mississippi valley can be saved from a similar fate by the regulated and automatic application of the fertilizer which Nature would bring to it so abundantly, no outlay would be too great for the establishment of the necessary engineering works. It is, moreover, to be remembered that the ordinary levee system, however costly and complete, is necessarily of only temporary service. The silt from the confined stream is deposited in the channel, instead of on the banks, and the water-level rises in consequence, making new embankments continually necessary, until the whole river is in some cases raised like an aqueduct above its banks, the bottom of the stream being higher than the surrounding country. Obviously, a break of the protecting embankment is in such cases peculiarly disastrous, and the danger goes on increasing *pari passu* with the aggregate of the sums sunk in guarding against it. With regulated overflow, on the contrary, the reverse would take place. Not only would the force of inundations, and with it their destructiveness in unprotected territory, be much diminished by the relief afforded through the overflow channels, but the relation between the river and its shores would be changed, the latter rising by successive deposits, instead of sinking more and more below the water-level.

THE great competition for the Victor Emmanuel memorial has reached a new stage. As our readers know, none of the prize designs were regarded as quite suitable for execution, and much dissatisfaction appears to have been excited in Italy by the award of the highest premium to a Frenchman, persons of that nation being particularly unpopular just at present beyond the Alps. Perhaps some idea of deference to this feeling may have influenced the Commission in charge of the monument, but it is fair to suppose that the real impracticability of the design placed first has decided the members to abandon it, and as it would be difficult to adopt one of inferior standing in the competition instead of it, a new beginning is to be made by the opening of a fresh competition, in which all the designs must represent an equestrian statue, situated in the centre of the Piazza dei Termi, and surrounded by a grand colonnaded portico, on the walls of which are to be represented the most mem-

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orable events of recent Italian history. Whether the competition is to be restricted to Italians we do not know, although there is precedent enough for such a condition, which would at least remove the danger of foreign interference with the prerogatives of native artists.

The competition for the new German Parliament-house closed June 10. One hundred and ninety-four designs were received in response to the eight hundred programmes issued, showing that great interest has been taken in the matter by architects throughout Germany. According to the *Bauzeitung* no architectural competition within its knowledge has attracted so many competitors, except that for the Victor Emmanuel memorial, in which two hundred and ninety-nine persons entered the lists. The great struggle for the Hamburg Town-hall was participated in by one hundred and forty-four architects, and the first competition for the Parliament-house by one hundred and two; but the much more interesting project of the Cathedral of Berlin attracted only fifty-one designs, and that for the Vienna Town-hall only sixty-three. It is intended to hasten the decision, so that the drawings may be exhibited, and with this intention three experts have been engaged to examine all the designs, and eliminate those in which the requirements of the programme have not been fulfilled in respect to the position and size of the various rooms.

Discoveries of interest continue to be made at Assos by the little expedition of the Archæological Institute. Quite recently another block of the epistyle of the temple has been found, and the story represented upon the only sculptured Doric architrave known is nearly or quite complete. Meanwhile excavations have been carried on in the lower city, which seem likely to yield remarkable results. The street of tombs is found to have been buried much more deeply in débris than was originally supposed, and a sarcophagus which when first discovered seemed to rest only on a low platform proves to be raised on a lofty stylobate. Several inscriptions have been found and read, and minor objects of utility or beauty are frequently thrown out from the trenches. Further investigations have been made into the construction of the stone bridge which crosses the river, and the main points well ascertained. Not far from the place where Messrs. Clarke and Bacon are winning fame for themselves and the association whose interests they serve, their kind friend of former years, Dr. Schliemann, is pursuing at Hissarlik a new series of explorations, which have already led him to some modification of the received opinion concerning the succession of cities upon that historic spot. Whether the zealous archæologist was driven from his work at Orchomenos, which promised to be so successful, by the illiberal policy of the present Grecian government, we do not know, but it seems rather unfortunate that so much energy and enthusiasm should be diverted from the scene of so many traditions to the comparatively barren field of the Troad.

Some remarkable discoveries have been made within a few months in Eastern Syria, which we may regard either as casting new light, or as throwing an additional mystery upon the dark problem of the origin of those structures known by the name of dolmens and menhirs, the so-called "megalithic" remains of a race which in some prehistoric age lived, and as we suppose, erected temples to its deities, after one uniform pattern in Asia, Africa, and every part of Europe. It is needless to say that the theory of the Druidic origin of the great stone circles and trilithic monuments of Britain has been generally abandoned, for the reason that the most important of them, at least, are believed to have been in existence ages before the introduction of the Druid cult into those regions; but by the industry of two officers of the Royal Engineers, Captain Conder and Lieutenant Mantell, an unexpected connection has been traced between them and the savage tribes of idolaters whose names are preserved in sacred history. It is only a few years since a society was formed in England for the collection and publication of information regarding the topography of the Holy Land, in the hope of elucidating certain doubtful points in the text of the Scriptures; and in the pursuit of this object a thorough trigonometric survey has been made of all Palestine. More recently the lines of the survey have been pushed across the Jordan into the region known to the Israelites as the land of Moab, and in the course of this operation a great number of monuments have been discovered at Heshbon, about fifty miles east of Jerusalem, bearing the closest resemblance to those so common in the British Islands and the neighboring portions of the Continent. In this district alone more than six hundred of the trilithic dolmens have been found, besides circles of stones and other familiar forms. The occurrence among them of groups of seven stones recalls at once the story of the seven altars erected by Balak upon the approach of the Israelites to his country, particularly as very many of the dolmens contain cup-shaped cavities in the upper stone, as if to receive the blood of victims, and it would not be strange if further coincidences should serve to connect them with the tribes overthrown by Joshua and his successors. Although not so large as those of Britain, the Moabite monuments comprise blocks of considerable size, many of the stones being eight or ten feet in at least one dimension. As similar structures appear to be scattered throughout the country east of the Jordan, one would expect to find them also in Palestine itself, which, before the arrival of the Israelites, was occupied by tribes of nearly the same origin and habits; but with the exception of a few in Galilee, a district considered by the Jews themselves as somewhat barbarous, none exist west of the Jordan, and the suggestion is made by the *Builder* that the iconoclastic zeal of the reaction against idolatry which took place under the good Hezekiah may have served to obliterate the last vestiges of a worship which was to the chosen people a matter of mortal sin.

Next to the sale of Prince Demidoff's collection of works of art at San Donato, the auction of the goods of the Duke of Hamilton, a reduced Scotch nobleman, seems likely to be the most remarkable event of the kind within the present decade. Prince Demidoff's motley collection was sold, it is said, because he was tired of it, and wanted to make room for another, while that of his North British contemporary is disposed of to satisfy the claims of importunate creditors. Except for the existence of some forgeries among them, the pictures are of considerable value, although the prices obtained for them at the sale averaged only about twenty-six hundred dollars apiece. The bric-à-brac sold better, but some of the articles would be considered cheap, as for instance two chairs, which were known to have belonged to Cardinal Wolsey, but brought less than a hundred and forty pounds, or about three hundred and twenty-five dollars each. A cabinet by Boule brought nearly eleven thousand dollars, and a china teapot nineteen hundred, while one pair of Sèvres vases sold for eight thousand dollars, another pair for six thousand, and a third for forty-eight hundred. Such sales as this, besides the good which they do in removing beautiful things from the custody of persons incapable of appreciating them, to distribute them among those who can, teach another lesson, — that good works of art, no matter how small and unpretending they may be, constitute the very best property in which money can be invested. While the great mass of ill-designed furniture, porcelain, glass or jewelry is pursuing its inevitable round of tawdry fashion, obsolescent shabbiness, and despised decay, the beautiful pieces are somehow cared for and preserved. As their contemporaries pass away they assume the new attraction of variety, or perhaps acquire some interest of association, without losing their innate grace, and every decade adds compound interest to the original value.

Messrs. Kraft, Holmes & Co., the occupants of a building which recently fell in St. Louis, have, as we learn from the *Scientific American*, caused an inquiry to be made by a committee of experts to determine the cause of the disaster. Upon examination no defects were found except in the basement piers, and a calculation was made of the weight actually sustained by the piers, which showed that each bore a load of about one hundred and eighty-nine tons. The sectional area of each was four and one-half square feet, making the total load per square foot on the brickwork forty-two tons. Although the actual resistance of brickwork to a crushing pressure is far from being definitely determined, all architects will acknowledge that even with the best of materials and workmanship there was danger in exposing the piers to such a strain, and the form, which was in plan that of a parallelogram one foot ten inches by two feet five inches, was by no means well chosen for advantageous resistance. The workmanship was, moreover, not of the best, and it cannot be considered surprising that the piers should have failed, as appears to have been the case.

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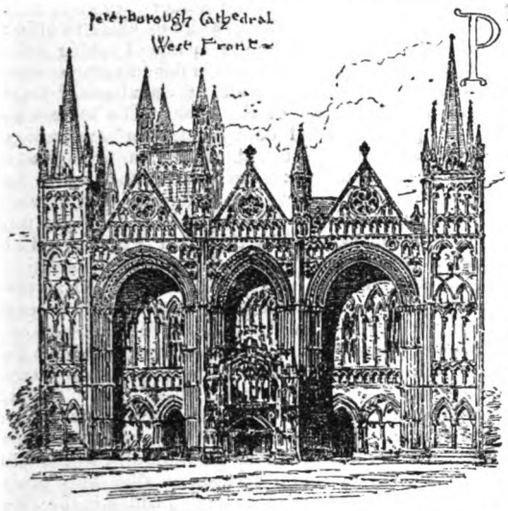
THE ENGLISH CATHEDRALS.—II.



PETERBOROUGH:—The west front of Peterborough Cathedral—"Peterborough the Proud" as it is called—with the three great unequal arched entrances of its great porch is one of the most easily remembered in England.

The dates assigned to the building, which was originally the church of an important Benedictine Abbey, are as follows:—

1118–1133. *Early Norman.*—Choir and eastern aisles of transept.
1155–1177. *Middle Norman.*—Transept and a small part of nave.
1177–1193. *Late Norman.*—Nave.
Transition Norman.—West transepts.
1200–1222. *Early English.*—West front and remains of Lady-chapel.
1438–1528. *Perpendicular.*—Eastern aisle.

Peterborough is often compared with the other two Norman cathedrals of almost the same date. The dimensions of the several naves are as follows:—

	Peterborough.	Ely.	Norwich.
Length of nave.	From west transept to western piers of central tower. 211 feet.	From western transept to octagon. 203 feet.	To choir screen. 200 feet.
Width of nave without aisles.	33 "	30 "	28 "
Height.	81 "	72.9 "	69.6 "

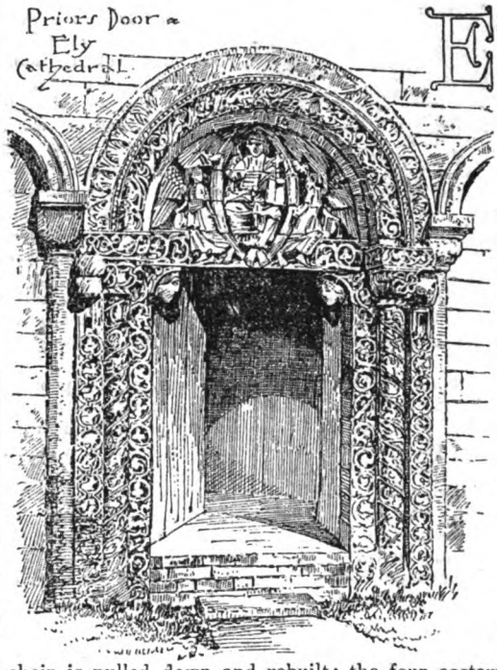
The nave is covered by a remarkable painted ceiling of twelfth-century work, which, originally flat, has been altered to a semi-octagonal shape. The central tower, built 1155–1177, proved too heavy for its supporting piers and was taken down as low as the crowns of the great arches, that it might escape the fate of the central towers at Ely and Winchester.

In 1643 the Cathedral was visited by Cromwell himself on his way to besiege Crowland, and as a consequence this cathedral suffered more than almost any other, and at this time all the charters and records were burned.

NORWICH:—The first stone of this cathedral was laid in 1096 on the site of an earlier Saxon church. The building retains its Norman character more than any other cathedral in England. The following dates have been assigned:

1096–1101. *Norman.*—Foundation laid and much work done.
1121–1145. *Norman.*—The nave—the largest in England—is built.
1171. The building is badly injured by fire.
1175–1200. The building is restored and completed.
1245–1257. *Early English.*—The Lady-chapel is built.
1297–1430. *Decorated.*—The cloisters are built.
1356–1369. *Perpendicular.*—The present spire is built. (In 1856 it was entirely re-faced.)
1426–1449. The west front is altered.
1446–1472. The nave is vaulted.
1463. The spire having been struck by lightning is repaired.
1472–1499. The clerestory and stone roof of choir are built.
1501–1536. The vaulting of the transepts is built.

A distinctive feature of this cathedral is formed by the immense open arcades of the triforium—which do not occur in any other English cathedral.



ELY:—The foundation of the existing cathedral was laid between 1082–1094 on the site of the convent of St. Etheldreda, which had been destroyed by the Northmen. The different parts of the building were built at the following dates:—

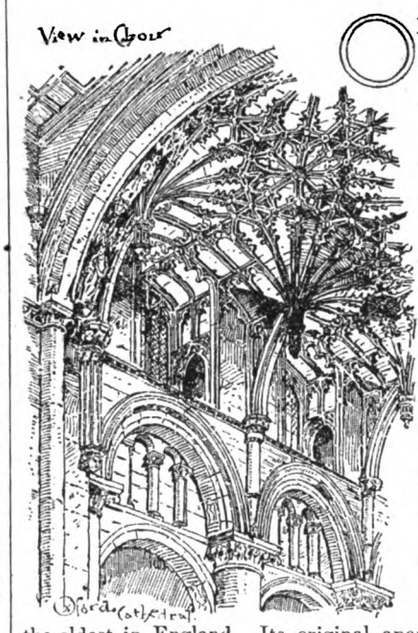
1174–1189. *Norman.*—The building finished as far as the west end, and the tower nearly to its summit.
1198–1215. The Galilee or western porch is built.
1235–1254. The Norman choir is pulled down and rebuilt; the four eastern bays are now in Early English, and the three western bays in Decorated work, built 1338–1362, after the fall of the centre tower.
1332. The central tower (Norman) falls and work is immediately begun on the present octagon, which is finished in 1342. The lantern is of wood.
1321–1349. *Decorated.*—The Lady-chapel is built.

The cathedral originally had western transepts, but the northern one of these fell at an unknown date, caused, possibly, by the building of the upper stories of the great western tower.

The lower (Norman) part of this western tower was built 1174–1189. The middle (Early English) stages were built 1189–1198. The octagon and its turret buttresses are Decorated. The original crowning spire has never been replaced.

The building has been continually in the hands of the restorer, one of the latest of these being Mr. G. G. Scott.

Measured from the exterior of the west porch to the outer face of the eastern buttresses, Ely Cathedral is the longest Gothic church in Europe.



OXFORD:—It would be difficult to find a more interesting study of a greater variety of styles in a smaller space than can be found in the little cathedral at Oxford—Christ Church, the smallest cathedral in England,—although the general flavor of the building is Norman.

Originally the existing building was the Church of St. Frideswide's priory, (1150–1180), which was in 1522 transferred to Wolsey, when he elected to build his college here, and as various additions and alterations have been made between these two periods, the building contains examples of the various styles from Norman to Perpendicular.

The spire is said to be the oldest in England. Its original apex may be examined with great ease, as after some restorations it was erected in the verger's garden.

The choir was restored in 1856, by Mr. Billings, and considerable restorations have been made as late as 1874.

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MODERN HOUSE-PAINTING.[1]

It is a rather queer phenomenon that the revival of the name of Queen Anne and the resuscitation of a variety of forms from the most colorless periods of English architecture should be coincident with a mania for the use of color in architectural work. The details that our American architects have zealously collected out of what they call colonial work, and accumulated in museums in their newest houses, look singularly out of their element, at least to one who looks at them in the light of association, in the many-colored clothing we now put on them. But since we have the clothing it is reasonable that we should have the book of fashions also, and this, not speaking it disparagingly, is what Messrs. Rossiter & Wright have given us.

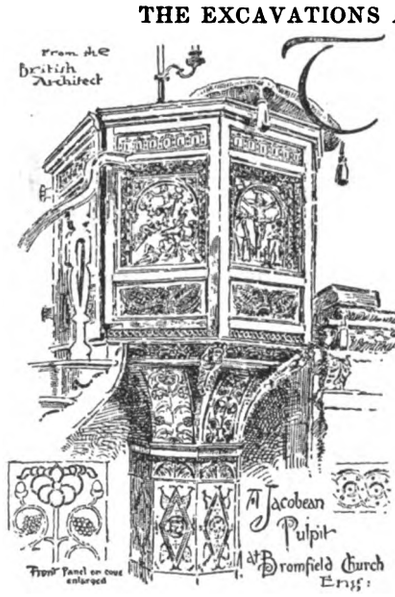
Criticism of the book is disarmed by the modesty of the preface, which certainly does not claim more than the book warrants. "If there are few," says the preface, "who can even distinguish between harmony and discord of color, how many are there who can give an intelligent answer as to what are the most suitable colors for painting? Even among the painters themselves, whom most people intrust with solving the problem, strange to say, one does not usually find the necessary knowledge and intelligence. It is not the purpose of the authors in this work to supply this deficiency: that would be too great an undertaking." Further on, in the chapter on color, the disclaimer is continued: "Those of our readers who expect to find lists comprising all the various scales of color, giving definite information as to what particular color should be used to harmonize with this or that shade, and telling just what combinations are allowable, and just what are to be condemned, will, therefore, be disappointed." So they will, we may add, by whatsoever book they may turn to with this expectation, however great may be its promises. The authors of this one eschew dogmatic precepts, and for the most part avoid abstract discussion. Even the doctrine of complimentaries is barely mentioned, and the opposition of warm and cool tones is dismissed with a word. A little more of general precept might safely have been given, we think, and a small list of safe combinations for the use of the uninstructed; but at least the reader will neither be led astray nor bewildered by æsthetic dogmas, and he may be thankful for the tone of common sense which pervades the work.

The book, then, is a book of patterns — examples of houses designed as it is the habit of architects here to design them nowadays, and painted as they are habitually painted. There is the usual perfunctory glance at the theory of color, with its primaries, secondaries, and tertiaries, and a recognition of the changes which modern discussion has made in the foundation of the theory. There is also a discreet chapter on the qualities and durability of pigments, including an enumeration, which the inexperienced reader will do well to note, of the painfully few colors which it is safe to use on outside work. The list includes all the colors that we have found to be really trustworthy, and we are somewhat surprised to find the authors, forgetting their caution, not only putting blue-black into nearly all their colors, but occasionally introducing Vandyke brown, mineral green, sepia, and even madder. Of their proposal to use a preliminary coat of crude petroleum on wood we will not venture to give an opinion, but it is perfectly safe to substitute a coat of clear raw linseed oil. The other remarks about preparation for painting are wise, and deserve attention, as do many practical suggestions to be found here and there in the book; but the reader should be warned that outside wood-work which is simply oiled is pretty sure, at least in a New England climate, to turn black.

When it comes to the plates the critic again finds his guns spiked by the declaration that the colors in them "varied considerably from the original designs, and in few cases are they just what the authors had in particular view." It is therefore not easy to do justice to the authors, — as it is not to be sure of how much benefit it will be to the unskilled reader to have examples set before him and be told that he must modify them. One practical precept touching the management of colors is given, which will be a safeguard to the unskilled, as it is a useful aid to the skilled: that it conduces to harmony to carry more or less of a common ingredient through the different colors that are used on a building. This is simply the mechanical statement of the artists' principle, which it would have done no harm to state abstractly, that colors are harmonized by being subdued to a common tone. And here, by the way, we give the word "tone" a wider meaning, and one more conformed to the common language of art, than that given it by the authors, who call it the mixture of "any normal color with either white or black in infinite variety of proportion." In truth the chief means of toning colors advised is to mix them with black, and this is done in almost every example. We are inclined to demur at this universal use of black, which is the prevailing mannerism of the book. The writers say truly that "the tones [*tints* it should be, by their own terminology] of any color produced by combination with white alone are apt to be weak and sickly in expression." But the truth is that white and black alike take the life out of colors; the difference is that white gives dead high tones, and black dead low tones. If the right tone can be got without either black or white the effect is sure to gain in richness and solidity. The plates furnish the reader a variety of combinations, a good share of which are to be commended as they stand, in spite of the printer's shortcomings. As the more successful we may perhaps select Nos. V, VII, IX, X, XVIII, in spite of a little forcing of color in one or two. We should recommend the amateur to study the plates through the paraffine paper that guards them, which, acting like a glazing, improves their tone. The authors' commendable desire to avoid glare in their colors is in a degree neutralized by their indulgence in a great number of them. Most of the plates show not less than four on the walls, which with the colors of roof and chimney would give six in all. This profusion of tints, perfectly characteristic of to-day's fashion is the chief fault that we should charge against the examples and against the fashion. Patchwork may be more fatal to unity and repose than high color. The prevalence of it is a conspicuous sign of the incapacity for breadth or quiet, which is the stumbling-block of American art. One marked contrast, not repeated in many places, is as much as one house will commonly bear: if there are more than one they should be on opposite elevations, where they cannot be seen together. Our book widely censures "the practice, which obtains to a great extent lately, of picking out small members in a brighter color than the rest, in order to enliven the whole," it might safely have carried its cautions farther in the same direction. The habit of painting all the finish of a wooden house of a different color from the body of the wall, a device which used in moderation is a valuable means of effect, has apparently become inveterate, and has proved itself one of the most mischief-making tricks of the day. We should advise the house-painter not to assume that this is his necessary resource: to think it sufficient if he uses two colors on his walls, unless the third is a closely related shade of one of the other two, or a necessary mediator between them; and in the interest of peaceful interiors and safe eyesight, not to paint his blinds red or orange. For an example of the danger that may lurk in the use of colors which are good enough in themselves, we will point the reader to Plate VIII. Here are five distinct colors on the wall, to which are to be added others for blinds, roofs and chimneys. He will hardly fail to note how such a treatment distracts the eye, and as the writers say on the opposite page, "gives the building a choppy and mincing effect."

[1] *Modern House-Painting.* Containing twenty Colored Lithographic Plates exhibiting the use of Color in Exterior and Interior House-painting, and embracing examples of simple and elaborate work in plain, graded and parti-colors. Also the Treatment of Old Styles of Houses; together with full descriptive letter-press, covering the Preparation, Use, and Application of Colors, with special directions applicable to each example: the whole work offering valuable hints and suggestions on Harmonious Color-Treatment, suitable to every variety of building. By E. K. Rossiter and F. A. Wright, Architects. New York: William T. Comstock.

THE EXCAVATIONS AT ROME.



The correspondent of the *Times* at Rome has sent the following communication to that journal, in continuation of those which have been published: —

The excavations at the east end of the Forum are completed for the present. They cannot be carried further towards the Palatine until arrangements have been made for diverting in some other direction the traffic along the road which passes there, and for taking down the little, deserted, and absolutely uninteresting church of Santa Maria Liberatrice. On this subject some of the clerical papers are already beginning to make an outcry; but, fortunately, there is the precedent of Paul III having pulled down three or four churches in the locality for the purpose of affording the great Cæsar of the day, Charles V, a better view of the grand remains of the ancient city.

It is to be hoped these arrangements will soon be completed, for at the very spot where it has been necessary to suspend the explorations some constructions of an important character have been found; but as to what they are, or may be part of, no opinion beyond the barest conjecture can be formed so long as the steep cliff of accumulation rising from the ancient level stands there, hiding, like an impenetrable curtain, what is immediately behind.

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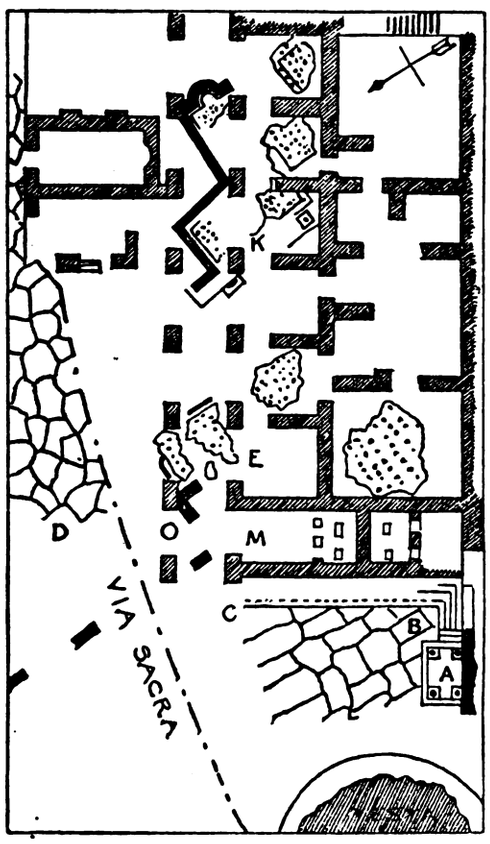
As the workmen were about three weeks ago approaching this spot they found the front and one of the side pieces — fitting exactly to each other, the joint being perfect — of the architrave and frieze of what might have been either a rectangular ædicula projecting from a wall and supported by two columns in front, or a doorway of that description, and on the frieze of the front piece was the inscription:

"SENATVS POPVLESQVE ROMANVS PECVNIA PVBLICA FACIENDAM CVRAVIT"

in two lines of well-cut letters of the best period, measuring five inches in height. As I informed you briefly at the time, Professor Jordan was disposed to conjecture that these were parts of the *fastigium* or pediment placed by the Senate upon the Regia to do honor to Cæsar, to which Cicero referred (Cic. Phil. II 43), and which Calphurnia on the night preceding Cæsar's murder dreamt was falling down. This seemed within the bounds of possibility, but it must be remembered that the Regia inhabited by Cæsar was burnt down during the Neronian conflagration (*vide* Tacitus), and these pieces of architrave, with the exception of being chipped a little, are uninjured and bear no traces of fire.

The appearance of the excavations at the time when these pieces were found was exceedingly interesting and curious. I have likened the accumulation as seen from below to a cliff. Against the lower part of this the men worked and excavated each day until it became overhanging, and as dusk approached preparations were made for the next morning by driving thick, sharp-pointed staves, shod with iron, into the summit at a short distance from the edge until a mass was loosened and tons of débris came down like an avalanche upon the level below, disclosing all behind it. By this means we had day by day a series of sections through the remains of this bit of the cities of Rome, built one upon the ruins and out of the remains of another from the days of the Gracchi until the Forum had become the Roman Smithfield — a filthy waste, made picturesque by the groups of campagna cattle lying about under a bright blue sky and among a few shafts of ancient columns half buried in the ground, suggestive only of the painful contrast between the vestiges of so much magnificence and the squalor all around them.



Within, upon, and among walls of the fine brickwork of imperial times, some standing, some prostrate, were others built of every variety of construction — of brickwork of the later periods, of bricks and lumps of stone worked in together, of broken fragments of white and other marbles; there was one piece of wall of good-sized square blocks of peperino, looking like a bit of a mediæval fortress, and another of large but somewhat irregular masses of white marble smooth on the face, that is to say, showing no signs of ornamentation. But on this wall being demolished — for while the later constructions are, as far as is practicable, also left *in situ*, yet some must perforce be removed — it was found to be built of marble bases turned on end with their lower planes outwards, pieces of architrave and pilasters, and other marble fittings, split up to the required dimensions, and among the rest a row of medium-sized composite capitals laid horizontally with their necks inwards and the foliage hidden in the mortar. Two of these capitals were at once found to agree with the indications on the two pieces of architrave and frieze I have mentioned. Some portions of the shafts of small plated columns, and of a pilaster with an engaged column corresponding in style and dimensions with these, had been found among the ruins at the same place; and on the demolition of the white-marble wall, of which the materials were so richly ornamented within, the construction to which these architectural features belonged was discovered standing out from the accumulation exactly where it has now been scraped. This construction, marked A on the annexed plan, is a small platform of brickwork measuring 10 feet 6 inches on the front, by 8 feet along the sides, and about 5 feet in height, with brick pilasters rising from the two posterior corners, against which the marble pilasters with engaged columns stood. Between these there would appear to have been access to something beyond, but this cannot be ascertained until the excavations are recommenced and continued. This platform was originally faced with marble. There is the white-marble base *in situ* along one side, and from its southeast side, or in other words, its left, as one looks towards it, there extends a flight of five well-worn travertine steps, surmounted by a kind of threshold. At the distance of a few feet from the platform these steps turn at a right angle at B, and continue for 36 feet towards the northeast, without there being any indication of their having terminated there at C. Of the more extended portion of this longer flight only the lowest step remains. Whether there was a corresponding rectangular arrangement of steps opposite to these — that is, on the right of the platform as one looks towards it — cannot be determined, for in the earlier excavations close around the remains of the podium of the Temple of Vesta, the ground close up to the side of the platform had been cut away to a level of some 16 inches below where the steps would have been. I must draw attention to the fact that the platform and the steps, which, judging from the brickwork, cannot date much later than the time of the Antonines, were built upon a pavement, of earlier date, formed of large regularly-placed slabs of travertine, which lie, as a glance at the platform will show, in a direction diagonal to the platform and steps upon them, but parallel and at right angles to the lines of the remains of the Regia in front of which they are situated. As the annexed plan does not include the front of the Temple of Antoninus and Faustina, I must mention that the platform A stands exactly opposite to the three columns of its pronaos, nearest the arch of Titus.

I have described the discovery somewhat in detail for the reason that in it we have a notable, but thus far unknown feature of what in general terms may be called the east end of the Forum in the days of its magnificence. It would be idle to occupy space by considering the different opinions which thus far have been only hesitatingly pronounced regarding it; but for the fuller information of English archæological scholars, I may add that the line of steps B C stands at a distance of about 32 feet from the approximate position of the lowest of the circular flight of steps of the Temple of Vesta, and there are no more than 15 feet between the position of that lowest step and the northwest corner of the platform A.

The entire removal of the layer of earth left above the pavements of the ancient level, while the excavators' carts were rolling backwards and forwards over them, has afforded fuller information on points which were sufficiently evident three weeks ago, as will be seen by reference to the plan, which is limited to a smaller area and drawn on a larger scale, so as to permit of the details of the Regia found being more clearly defined than was practicable in the more extended plan appended to my last letter. The basalt paving-stones along the primitive — the ante-Neronian — line of the Via Sacra are seen to be in their places as far as D, which is 42 feet beyond the spot marked F in my last plan, and is distant only 65 feet in a direct line past the Temple of Vesta. Further remains of the mosaic floors of the Regia, marked by dots inside, or against double lines to indicate their borders, have been uncovered, extending as far as E to the westward of the travertine bases covered with stucco painted red at K, which I have previously described, and at O another vestige of the walls with red stucco upon it has been uncovered. It is evident, therefore, that the columns at K were internal features, and that the façade was on a line nearer to the Temple of Vesta. These mosaic floors apparently extend also under the remains of a small balneum marked M among the latter edifices built against the back of the line of steps B C, and of which the upper floors at the hot-air chamber, supported on little pilasters, is in a comparatively perfect state. This may, perhaps, have been the Balneum Polycleti which Pauvinius mentions in his list next to the Lacus Internæ.

Along and below the level of the front of the columns at K a continuous channel cut in travertine has been found, within it fragments of a lead water-pipe much injured by fire, of which there were very evident traces at this point, even including bits of charred wood. The area on part of the east side of the Temple of Antoninus and Faustina has been cleared, and it is found to be paved with splendid slabs of white marble, scarcely injured, measuring nearly 4′ x 8′.

As one of the many instances of how these and previous excavations throw light upon, explain, and confirm passages in the classic authors which have been difficult to comprehend, and impart new interest to them, I may mention that, standing on the lower level with that clear view of the rise of the Via Sacra to the Velia which the removal of the causeway across to the northwest corner of the Palatine now permits, we perceive at once the full force of the adverse opinion expressed by Apollodorus when he told the Emperor Hadrian that his Temple of Venus at Rome should have been loftier, and have had a more imposing aspect towards the Via Sacra. That temple stood in full view of those walking up the incline of the Via Sacra, but situated as it was in the middle and down on the level of the spacious plateau which was constructed for it and which extended to a considerable distance from its end and sides, it must

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have presented the same dwarfed or sunken appearance to those approaching it from below and up an incline, as the dome of St. Peter's does to people standing on the Piazza in front of it.

The marble features of the platform A that have been discovered are sufficiently complete to permit of their being restored to their places, and this I understand is to be done — the wanting portions being supplied in plain travertine in the way adopted when the Arch of Titus was recased in the year 1827, and when later the little fallen portico of the Dii Consentes was re-erected on the Clivius Capitolinus.

I have this moment received the gratifying intelligence that the Minister Baccelli has given orders that the excavations towards the Palatine shall be recommenced almost immediately in order to solve the problems connected with the platform described in this letter and suggested by the fragment of the Capitoline plan recently discovered. — *The Architect.*

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR A COUNTRY HOTEL STABLE. MESSRS. WILFRED A. NORRIS AND FRANCIS MINOT ("*Pegasus*"), BOSTON, MASS.

"*Pegasus*" also offers an hospitable covered entrance, with spacious and convenient carriage-room which would, however, be made more accessible if the doors had been wider. The harness-room also is conveniently placed, but should have communication with the carriage-house. The stable is large and well ordered. The second-floor plans for bedrooms is only reached by a staircase from the living-room, which turns the latter into a mere hall. No provision seems made for washing carriages, nor for a well-house. The elevations are most picturesquely composed and ingeniously treated, the entrance being emphasized by a detached chimney, while opposite a quaint gable challenges attention. The general aspect is that of a building built at different times, rather than by a preconceived and matured plan; yet it is so entirely in the character of a rural barn and stable, and would be such an attractive dependency to a country inn that we give it a high place in the competition.

COMPETITIVE DESIGN FOR A COUNTRY HOTEL STABLE. MR. J. W. H. WATTS ("*Paul Kieff*"), OTTAWA, CAN.

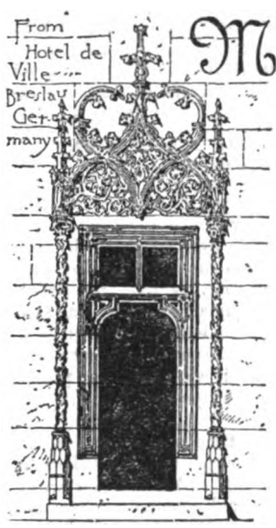
"*Paul Kieff*" has a very spacious disposition of plan in which the different services are well considered. With so much room we should have been glad to see more accommodation given to visitors not baiting; and the carriage-room though ample is not so convenient for manœuvring vehicles as if its length were greater in proportion to its depth. It is unfortunate to have to turn so sharp a corner before the visitor can see where to leave his team. The bedrooms cover so much space that they deserve a more special system of light and ventilation than the author's elevations accord them. In other respects the elevations are straightforward and sensible, depending upon their large masses for their architectural effect, and entirely expressing the character and purposes of the building. On the whole this design gives an excellent solution of the problem. The drawing is skilful and sparkling, and the bird's-eye perspective is cleverly conceived and executed.

COMPETITIVE DESIGN FOR A COUNTRY HOTEL STABLE. MR. A. PAGE BROWN ("*Jockey*"), NEW YORK, N. Y.

The accommodation for carriage-sheds, and one especially for wagons, arranged about a wide yard, as well as the simplicity and easy circulation in the stable gives "*Jockey*" one of the foremost positions among the competitors. There is throughout his design an air of generous accommodation. It was a capital idea to leave to the centre of the stable the spacious two-storied wash-room with a light balcony around it giving circulation to the excellent accommodations in the second story. The harness-room is ample, but it would be better to have given it more direct communication with the coach-houses; the carriage-house directly adjoining it should open largely into the yard, so that it would then have served for a temporary halting place for teams. The elevations show the same breadth of treatment as the plan. The masses are largely treated, their extreme simplicity giving quiet dignity to an unaffected composition. The pretty and cosey porch and pump in front of the office, obtains an extraordinary value and interest from the simplicity of the rest of the building. It is a charming conceit well placed. We regret to find this interesting design marked "*Hors Concours*" from tardiness.

THE SMELL OF PAINT. — To get rid of this most objectionable odor in a chamber or a living-room, slice a few onions and put them in a pail of water in the centre of the room; close the doors, leave the window open a little, and in a few hours the disagreeable smell will have almost gone. Another method is to plunge a handful of hay into a pailful of water, and let it stand in the newly-painted room over a night: this plan is also effectual. The foregoing have the important advantage of being simple remedies, as the necessary materials are always easily obtainable. Yet another plan, but it is rather more complicated: Place a grate of lighted charcoal on a piece of flag or slate in the centre of the room, and throw on it a handful or two of juniper berries; shut out all ventilation from the room for twenty-four hours; the doors and windows can then be opened, when it will be found that the nasty, sickly smell of paint has entirely gone. The furniture may be left in the room during the process, and none of it will be injured. — *California Architect.*

FORESTRY IN GREAT BRITAIN.



M. BOPPE, Inspector of French Forests, recently made a report to the India Office of which the following is an abstract: —

The total area of Scotland is about 20,000,000 acres, hardly one quarter of which may be reckoned as arable, forest, or pasture land, the remainder being occupied by the lakes, rivers, peat-mosses, moorlands, bare rocks and mountains. It is surprising then to find that against such a vast area of uncultivated ground only 734,490 acres, according to the official returns of 1872, are classed as woodlands.

There is every reason to suppose that at a remote period, both the Highlands and Lowlands of Scotland were covered by dense forests, which were successively destroyed by the fire and steel of conquerors, and during the anarchy existing under the old feudal system, as well as by the feudal storms which at almost regular intervals sweep over certain districts. So complete, indeed, was this devastation, that, in 1707, all that remained of the grand old Caledonian forests were a few shreds, and those in a most deplorable condition.

Under the wise patronage of the "Select Society" of Edinburgh, founded in 1754, the area of forest land augmented rapidly, so that, in 1812, Scotland possessed, besides 500,000 acres of natural forest, about 400,000 acres of plantations.

The year 1815 marks a pause in the work of replanting which had been so vigorously begun.

The returns of 1872, as compared with those of 1812, show a diminution of some 200,000 acres in the area of forest land in Scotland. Whether it was a portion of the old natural forest or the newly planted ones that had disappeared during this period of sixty years, the documents extant do not show. There is, however, good reason to suppose that both suffered equally in this respect. For, on the one hand, the construction of the Highland Railway necessitated the employment of a large number of sleepers, which could be procured from the woods of from fifty to eighty years of age, along the line of route; and, on the other hand, the increased facilities of transport, and the scarcity of wood in England, gave an unexpected value to certain tracts covered with birch, and so tempted many of the proprietors to cut down the old forests composed of this species.

In 1870 the work of replanting seems to have recommenced with increased ardor, and on all sides may be seen young plantations vigorously striving to fill up the gap which separates them from those of half a century's standing.

From a forest point of view Scotland may be divided into two distinct regions, by an imaginary line drawn from Perth, on the Firth of Tay, to Greenock, on the estuary of the Clyde. To the south of this line we find the lowlands, a country which agriculture and manufacture have combined to render one of the richest in the world. The economic situation of this wealthy district is as prosperous as possible, and the thoroughly developed system of high farming which is there employed leaves but little room for forest cultivation. The Lowlands are bounded on the south by the Cheviot Hills, which afford excellent sheep-walks. To the north of this line lie the Highlands, intersected in all directions by the far-stretching chain of the Grampians, whose rugged nature gives to the country an aspect not unlike that of the western coast of the Scandinavian Peninsula. One would imagine that at some earlier geological period immense polar glaciers, flowing over the solidified North Sea, traversed the whole of the north of Scotland, polishing on their way the mountain sides, excavating the lake beds, and breaking off abruptly the cliffs surrounding the coast. The culture of cereals is here confined to a few favored localities, situated near the mouths of the rivers or on the low-lying ground bordering the sea, where the glacial deposits constitute an excellent soil. The rest of the country is wholly occupied by water and heather, and thus out of the 13,000,000 acres which this region comprises, only 1,600,000 (or less than one-eighth) are classed as arable, forest and pasture lands. If out of the remaining 11,000,000 acres of unproductive land we allow a half for the lakes, bare ridges, and sterile mountain tops, there will still remain 5,000,000 acres capable of furnishing valuable timber forests. Here, then, is a problem for British economists, and a vast field for enterprise and capital.

In the Highlands, to which we principally directed our attention, the districts around Perth, Elgin, and Inverness, are those in which the most extensive forests are to be found. These three counties together contain about 247,700 acres of forest, and being well served by the Highland Railway system, these are easier to visit than any of the other Scotch forests. Starting from Perth, we made our way across the Highlands, visiting *en route* the towns of Dunkeld, Blair Athole, Aviemore, Grantown, Forres, Inverness, and Beauly. We were thus enabled, not only to make an inspection of some of the

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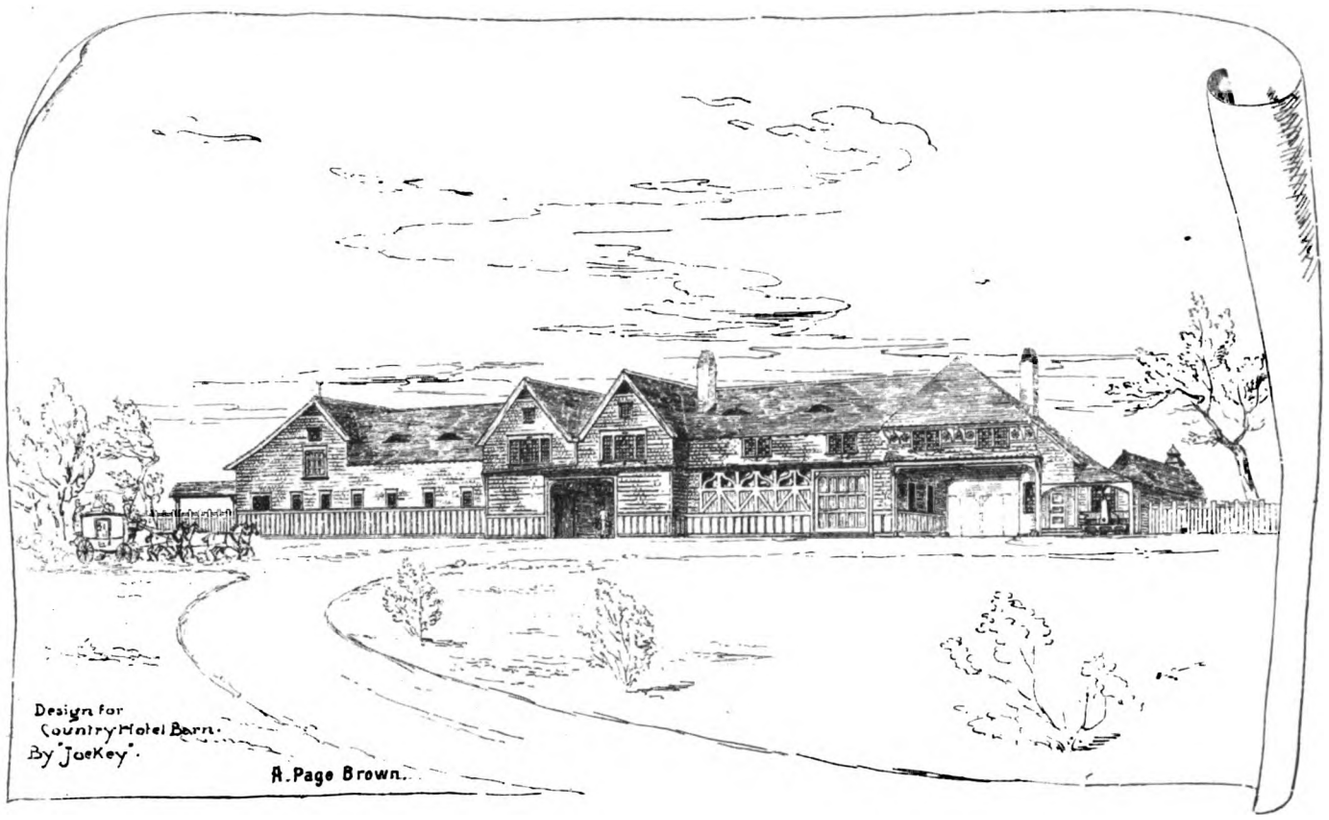

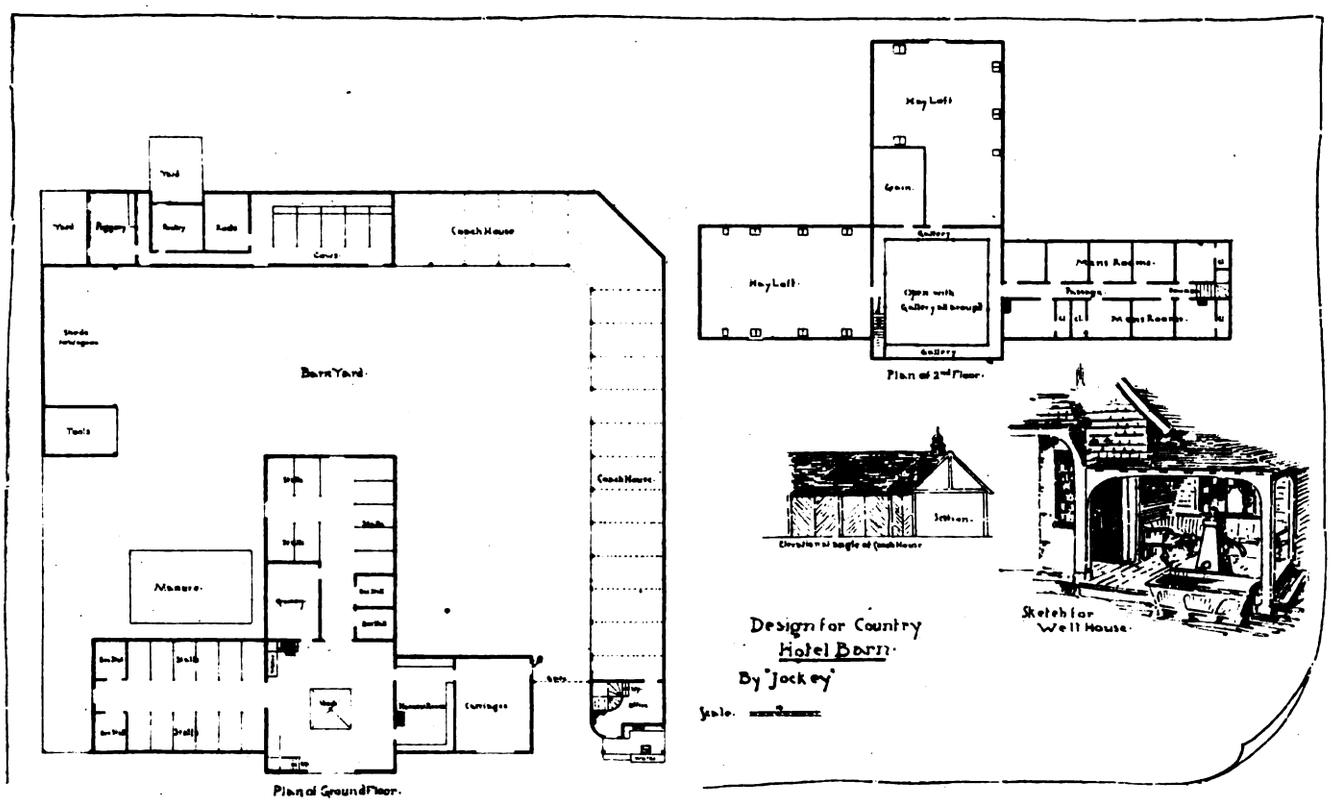

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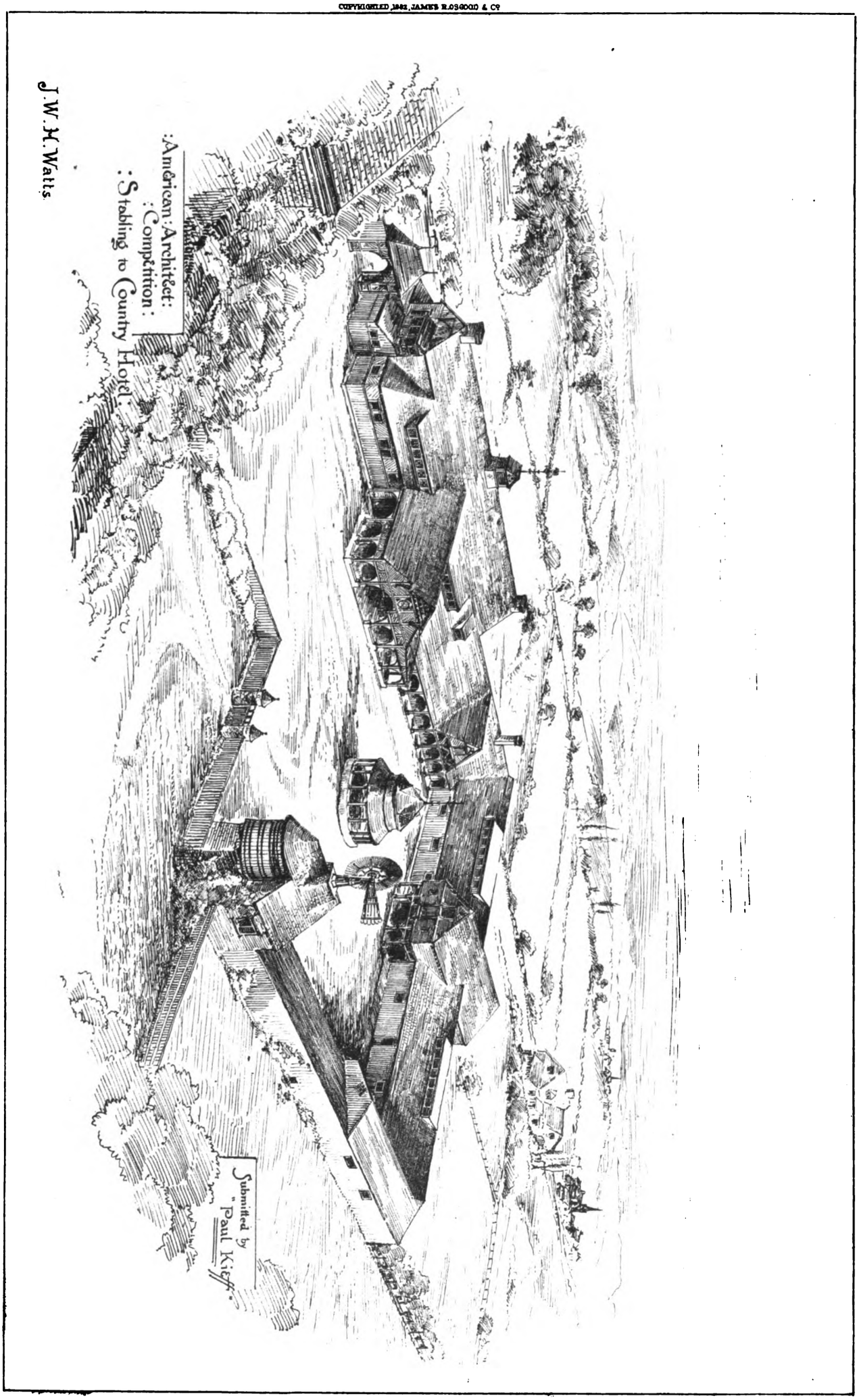

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American Architect and Building News Competition:
Stable for a Country Hotel.
by Pegasus.

W. A. Norris.
F. Minot.

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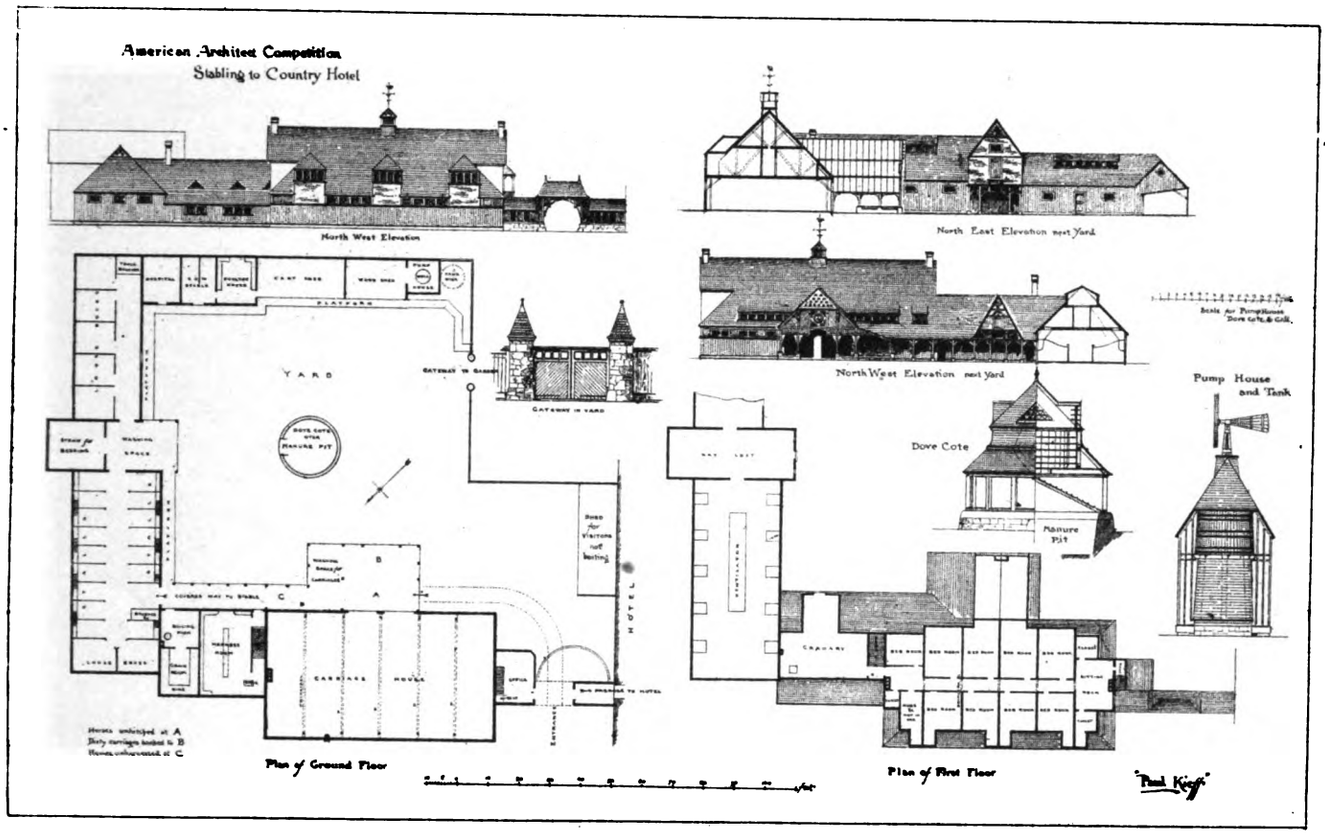

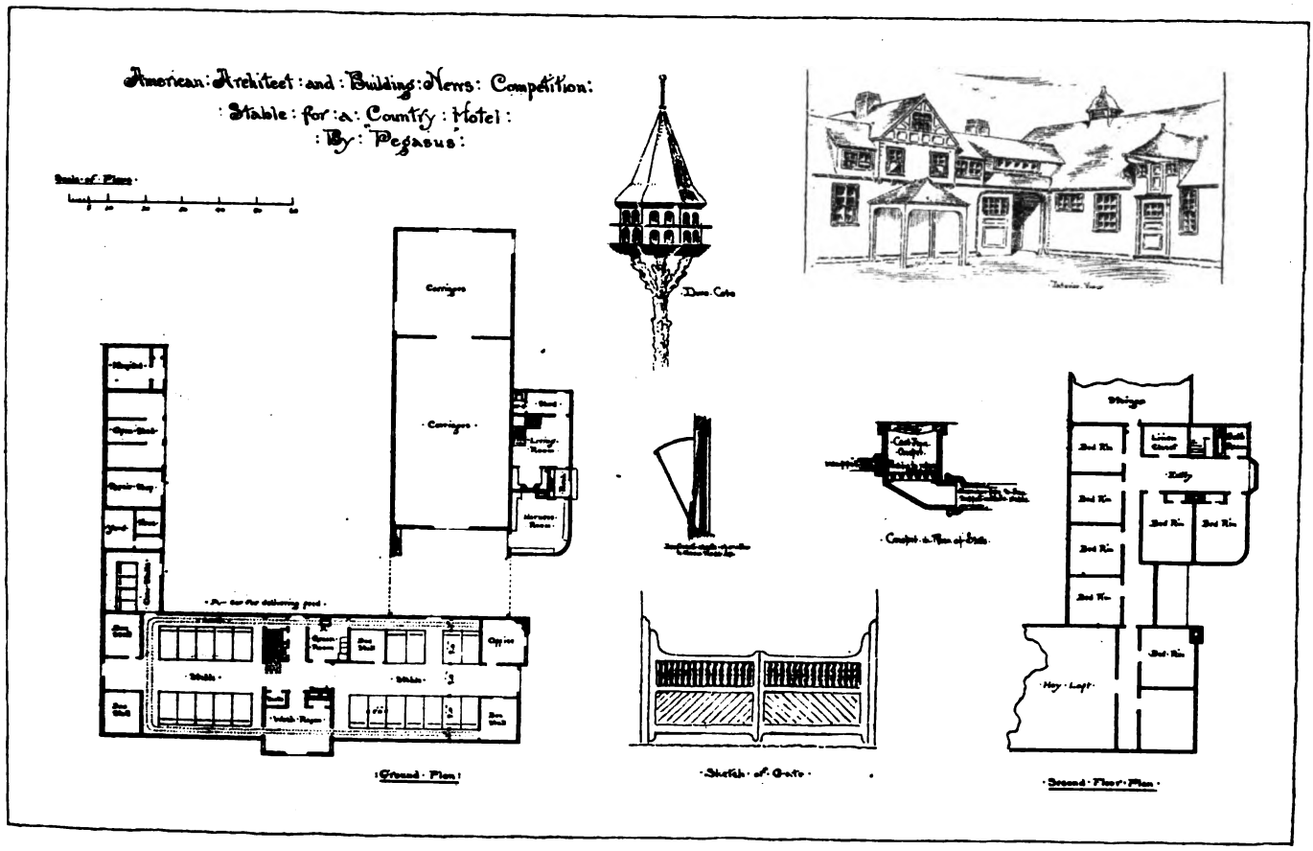

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finest forests in Scotland, but at the same time to obtain a fair idea of the general aspect of the country.

In the low-lying districts, at an altitude of from 250 to 800 feet, we found growing, both singly along the roadside, and collectively in the forests, magnificent specimens of oak, maple, elm, ash, beech, and lime, which, by the vigor of their growth, and the rich coloring of their foliage, bore testimony to the favorable conditions of soil and climate under which they grew. We were struck with admiration in beholding the colossal trees of every description forming the avenues at Scone, Dunkeld, Blair Athole, and Darnaway. It was near the first of these places that the venerable father of Scotch forestry, Mr. McCorquodale, showed us, with legitimate pride, a small oak forest of about 400 acres, which sixty years before, he had himself assisted to plant. In this forest, the trees were standing about 24 to 30 feet apart, and their diameters measured from 12 to 18 inches, whilst their magnificent tops formed a perfect canopy of leaves above the bright rhododendrons, in which colonies of young pheasants found a home. In the spring time this ought indeed to be a fairy-like spot. But, independently of this undergrowth, which is, after all, only suitable for the wealthy few, we cannot help thinking that a more careful study of this superb forest would go far towards clearing up some of the doubts which have always surrounded the difficult question of the cultivation of forests composed solely of oak.

The mountain vegetation commenced at about four hundred feet above the level of the sea; beyond this we find ourselves in the domains of the Scotch fir, the larch, and the birch.

In selecting the Scotch fir as the tree to be cultivated before all others in these regions, the promoters of forest plantation, during the latter half of the past century, showed no mean proof of their thorough appreciation of the natural requirements of the soil and climate of the Highlands, for not only have they insured the success of their operations, but they have traced out the best line of action for their successors.

Equally fortunate were they in their endeavor to introduce the larch into Scotland; transported from the ice-bound summits of the Alps to a country where the climate is tempered by the softening influence of the Gulf Stream, this tree does not appear to have suffered to any material extent by so sudden a change of latitude.

When in 1737 the Duke of Athole brought home amongst his baggage, as a kind of remembrance of his travels in Tyrol, the seeds which were sown in his park, and from which sprung the first larches in Scotland, he rendered a most valuable service to his country.

From a forest point of view, the results obtained by the cultivation of these two species (Scotch fir and larch), are truly marvellous. Any one who has seen the beautiful larch forests, planted in 1815 on the banks of Loch Ortie, and the vast stretches of Scotch fir covering the flanks of the Bruarwood Mountain, cannot fail to admit that the question of the replanting of the Scotch Highlands is practically answered.

The absence of the beech from all the forests of any standing is easily accounted for by the fact that it is only quite recently that the timber of this tree has become of any value for industrial purposes. For many cultural reasons, however, the beech is a tree of the highest importance, and we should strongly recommend its introduction into all future plantations, and it is, moreover, as much indigenous as the Scotch fir and birch. In many cases even it might with great advantage be substituted for this latter, or, better still, mixed with it.

Considering, too, the wonderful success that has attended the introduction of the larch, we think that a similar attempt might be made to acclimatise the *Pinus montana* in the peat mosses.

We were also struck by the monotonous regularity in the height and age of the trees, unmistakable sign of their artificial origin, and want of methodical management. The forest, here left to its own devices, continues growing just as the hand of man has planted it; the undergrowth is constantly grazed down by the sheep and cattle, and nature, in spite of the immense resources at her disposal is quite powerless to modify the work of the planter, or repair the errors committed by woodcutters.

When, under such circumstances, the time arrives for the trees to be cut down, or should they be uprooted by a hurricane, the forest disappears in its entirety, owing to the total want of young growth which is necessary as a link between the old forest and the new one which ought to be created. Such, at least, appears to us to be the case in all the forests that we visited in the valley of the Tay and its tributaries, and further north, near the foot of Cairngorm.

It is an established fact, beyond all contradiction, that on any soil, whatever its geological origin, a complete covering of forest vegetation will kill the heather as soon as the trees reach the age of between thirty and forty years. Suppose then that one hundred and twenty years be the term fixed for the existence of the trees in any portion of the forest, and that the trees of one hundred years and over are reserved, there would still be one-half of the forest always open to the sheep, and the other closed. But, at the same time, it is certain that this open half, owing to its superior quality, will furnish pasturage for at least twice as many head of cattle or sheep as the same quantity of moorland.

Although, under ordinary conditions, the regeneration of a forest will be sufficiently assured by the exercise of a discreet control over the grazing, something more than this must be done if it is desired to turn the land to the best possible account. It is, therefore a matter of regret that nothing has been done to place forest management in Scotland on a sound economic basis.

The productive powers of the soil and of the climate have been made use of by able and intelligent planters, who have thereby enabled nature herself to accumulate a considerable store of timber; but all this wealth is exposed to the carelessness of some and to the ignorance of others, until the hand of a forester manages it properly, and places it on the only sound economic principle of all agricultural and forest property — a constant annual revenue, and a constant improvement in production.

No doubt people are often frightened by the long names and big words they find in treatises on scientific forest management, but they may very well neglect the text if only they will adopt some of the principles which they contain. Let the owner of a forest, after having made a careful and detailed inspection of it, divide it off into blocks or compartments, so arranged that they should be uniform as regards conditions of soil and of planting, and then proceed to count and measure all the trees of three feet girth and upwards, classing them in categories according to their diameter. He should then open a debit and credit account for each compartment, placing on the debit side the actual volume of the standing crop, and on the credit side the volume of timber removed at each successive felling. The register should always be consulted before undertaking any forest operation, and when the annual fellings fall due, it will show which compartments can best support the withdrawal of timber, and which require to be left untouched. Moreover, the balance-sheet will render an exact account, favorable or otherwise, of the condition of the forest.

Ten years of such systematic treatment would form in itself the basis of a regular working plan, and the doctor's prescription would no longer frighten the patient with his long words.

Windsor Park is indeed one of the most magnificent fields for the study of forest botany that even the wildest imagination could conjure up. Here may be seen, growing singly or collectively in clumps, specimens of all the finest trees, native or exotic, which exist in Great Britain; and, since care has been taken to keep an exact record of the age and origin of each plantation, the forester would be enabled to follow out in detail studies of the highest interest and importance regarding the growth of the principal forest species. It would be more difficult to do the same with regard to their longevity; for one is led to think, in looking at some of them, that, in this hallowed ground, trees never die of old age. One sees in these relics of the past, that religious respect for things so characteristic of Englishmen, when even the most violent revolutions could pass over the country, and yet leave these monuments and these trees intact.

New Forest.—For many centuries the New Forest has been a prey to commoners, who use up its resources without either method or control. One may see there the steady onward progress which is made by the heather; and although it is not perhaps so quick under the feet of the almost wild ponies and cattle as under those of the sheep, yet it is none the less sure.

The sole remedy for this state of things was to restrict the commoners to certain defined localities, and that could only be done by sacrificing a portion of the forest to save the rest. This is in fact, what was done about twenty years ago; but the sacrifice has indeed been a heavy one, for the reservation of some 14,000 acres has cost the abandonment of 49,000 more. The part which has been freed, however, is sufficiently extensive to constitute some day a respectable forest, while the part given up is hurrying to its destruction in a manner deplorable to behold, and before very long, there will be nothing left but a worthless barren heath.

Without contesting the marvellous beauty of some parts of the New Forest, so dear to artists and lovers of nature, we are bound to say that before long if will not be here that a professor of sylviculture, desirous of teaching his science, will choose to pitch his tent.

Forest of Dean. — The present Forest of Dean occupies the site of the old forest of the same name, which formerly covered the whole of the plateau between the estuary of the Severn and the valley of the Wye ("Dean," "dên," signifies "forest" in the old Celtic language). The old forest has disappeared within the last few centuries, owing perhaps to the demand for charcoal and mine-props for the local industries; if, however, we were not afraid of being accused of being prejudiced, we might say that unrestricted pasturage may have had something to do with the disappearance. It is on these rules that the new Forest of Dean has been created; in less than a century, more than 16,000 acres of the original 22,000 have been replanted. The older plantations are generally of pure oak; the beeches, chestnuts, and birches form but a small percentage of the trees. Scotch fir, spruce, fir and larch are generally only found in the plantations made during the last thirty years, or in bad peaty portions. The state of vegetation is generally good, varying, however, with the quality of the soil, but indicating in every point the artificial nature of the soil.

We may take this opportunity of remarking that a plantation of "broad-leaved" trees (oak, beech, etc.) takes a much longer time to establish itself than one of the "needle-leaved" trees (conifers, Scotch fir, larch, etc.) In Scotland we saw the most magnificent plantations of larch and fir, whilst in the Forests of Dean the plantations of oak were always more or less dwarfed in appearance. The cause of this is that oaks furnish the soil with much less vege-

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table manure than the coniferous trees; and again, in an oak plantation there is a marked absence of undershrubs and spontaneous ground vegetation, which, by their organic remains, tend to increase and improve the surface soil. It is rare also that a plantation of oaks, on a soil which has been long unoccupied by forest vegetation and is but moderate in quality, succeeds well during the first generation: it is only at the second generation that the trees acquire their normal development.

At present, while the trees are yet in their youth, the only cultural operation that can be undertaken are the periodical "thinnings," and these are here conducted with great skill. There is, no doubt, however, a future in store for the Forest of Dean, thanks to the workmanlike manner in which it is managed, and to the laws regulating the pasturage, which date back to the time of Charles I.

In answer to the question whether the immediate foundation of a forest school in Great Britain is possible, M. Boppe went on to make the following recommendations: After making every allowance for the great fertility of the soil in Great Britain, we feel certain that in many districts more than one of the forests which were cleared some time back would now be jealously preserved by the same proprietors who formerly cut them down to satisfy their pressing wants.

It must also be borne in mind that the British Empire is not confined to Great Britain and Ireland, and that, by reason of her immense possessions, England is, perhaps of all nations in the world, the one most richly endowed with valuable forests. It is by hundreds of millions of acres that we may recken the forests of Canada, India, and Australia, New Zealand and Cape Colony, not to speak of those in the West Indies and Borneo.[1] All these natural sources of wealth are worked by British enterprise and British capital, and, consequent on the present wonderful development of commerce throughout the globe, it is a matter of importance to every civilized nation that this vast accumulation of forest riches should not fall into the hands of ignorant persons, or be squandered away, regardless of the future.

For these reasons the establishment of a Forest School in England becomes a matter of primary importance.

The science of forestry is, however, a science of observation, based upon facts which must be studied both from a practical and theoretical point of view. It is therefore absolutely necessary that a Forest School should have attached to it a forest which has for some time past been under scientific management, serving, so to speak, as a natural laboratory for experiments, and without which the best theoretical teaching in the world would be of no avail.

It is necessary also to take measures for preparing the public mind to regard the science of sylviculture as an additional means of developing the national resources, and to take steps for the gradual creation of accessory forests.

This accessory forest must necessarily be incomplete at first, but would be perfected in time; but the essential point is that it should be placed under the absolute control of the officers of the school. This can only be done by choosing a State forest. If it should be considered desirable also, in order to render the teaching more complete, the State ought to purchase or lease in Scotland a forest suitable for the purpose.

We would also suggest the founding of Professorships of "Forest Economy" at two of the great public seats of technical instruction. One of these might be instituted at Cooper's Hill for England, the other at Edinburgh for Scotland.

The professors should be selected from among the young men who have received a thorough forest education on the Continent, and have had eight or ten years' practical experience in India. They should publish from time to time a series of articles in the leading agricultural and forest journals, in order to influence the landowners in favor of a systematic management of their woodlands, and to prove to them that uncontrolled pasturage is the certain destruction of forests, and that, in the long run, the timber furnished by forest land is of greater value than pasturage or game.

In conclusion we beg to submit the following recommendations: —

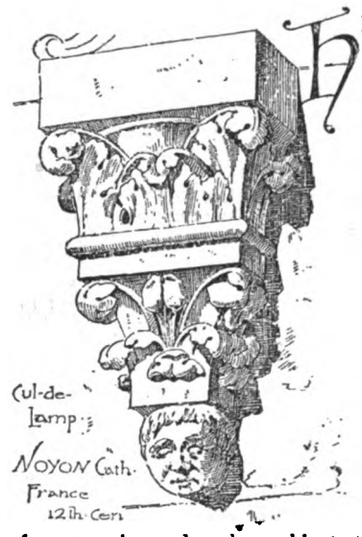
1. That a National Forest School be founded in Great Britain.
2. That Professorships of Sylviculture be instituted at Cooper's Hill and at Edinburgh.

Such are the conclusions at which we, in conjunction with our travelling companions, Messrs. Reuss and Bartet, have arrived, and we feel that an apology is due for their length. This is really due to the excessive courtesy of our hosts, who, jealous of the success of Jules Verne's hero, who made the tour of the world in eighty days, were determined to make us traverse, in less than three weeks, more than 300,000 acres of forest land situated in the most opposite parts of Great Britain, from Cape Duncansby to St. Catherine's Point.— *Journal of the Society of Arts.*

Are Cities exposed to Lightning? — The theory that multitudinous high buildings and tapering spires so distribute electricity that severe and damaging thunder storms are rare in great cities is strengthened by the fact that up to June 2 London had not been visited by a single thunder storm, whereas fatal accidents from lightning had been unusually numerous in the Midland counties of England. On the other hand the same theory is curiously contradicted by the records of the Berlin Fire Brigade, which show that recently, in a single hour, the brigade received twenty-eight calls to extinguish fires caused by lightning. — *New York Tribune.*

[1] The total extent of the forests in the British possessions is 340,000,000 acres of timbered land.

THE COMPARATIVE VALUE OF TESTING HOUSE-DRAINS BEFORE AND AFTER OCCUPATION.



HIS Royal Highness, the Duke of Connaught, has done good public service in suggesting to Professor Playfair the propriety of placing before the medical profession the defective sanitary condition of his residence at Bagshot Park, as no better illustration can possibly be given as to the necessity for having dwelling-houses thoroughly tested before passing from the hands of the constructors to those of the occupants. The note, by Professor Playfair, "On the Sanitary Condition of Bagshot Park," possesses much more than a general interest to the medical profession, who have to do with the treatment of disease: it concerns more immediately the general public, who are exposed, from faults of construction and workmanship, to the incidence of disease and the consequences thereof.

Bagshot Park, it appears, is an entirely new building, recently erected at a cost of from thirty to forty thousand pounds, and we doubt not that His Royal Highness, when he entered on the occupancy thereof, was under the impression that its sanitary arrangements were perfect in construction and workmanship. He had a right so to conclude; for the drainage system, as regards arrangement and ventilation, had been submitted to, and examined by, Sir Howard Elphinstone, R. E.; and doubtless the best architects and the most trustworthy tradesmen had been employed in the construction of the mansion. Possibly the Duke of Connaught took no special interest in that portion of his mansion which was hid from view by boards, pavement and marble, and the propriety of having the drainage system tested may never have occurred to him; but it is more probable that His Royal Highness placed implicit confidence in the comptroller of his household, that the comptroller of the household placed implicit confidence in the architects, that the architects placed implicit confidence in the clerk of the works, that the clerk of the works placed implicit confidence in the builders and plumbers, that the builders and plumbers placed implicit confidence in their foremen, that the foremen placed implicit confidence in the journeymen, that the journeymen placed implicit confidence in the apprentices and laborers, and that the apprentices and laborers placed implicit confidence in the general principle of *how not to do it, or how to do it with the least possible trouble.* We may be wrong in placing the *onus* of blame on the apprentices and laborers engaged in the construction of the drains and pipes of Bagshot Park; but we cannot be far wrong in stating our opinion that His Highness has been the victim of a system which, as regards its results, closely resembles the *confidence trick*, Bagshot Park having been a veritable house that Jack built, all engaged in the construction thereof from the comptroller of the household down to the hodman and the heater of solder-irons having been honorable men; all the mischief having been done by that invisible ubiquitous urchin, the *confounded boy.* Had His Highness suggested the propriety of having the drainage-system of his mansion submitted to rigid experimental tests before it was occupied as a dwelling-house, he would probably have wounded the tender susceptibilities of all concerned, from the baronet down to the heater of irons and the mixer of mortar; but he would thereby have saved himself much money, more discomfort and inconvenience, and exposure to what might have been a fatal illness; for it will be necessary to gut out Bagshot Park and reconstruct it before it can be safely occupied as a residence. In view of the results, no one will be disposed to deny that it would have been much better had Mr. Rogers Field been requested to test the building before occupancy rather than after an experimental test had been applied to Her Highness the Duchess of Connaught.

The examination made by Mr. Rogers Field revealed a state of matters almost incredible, and if such conditions exist in houses built presumably with the greatest care and regardless of expense, what can we expect to find in mansions of a less pretentious nature — in the isolated dwellings of the middle classes, and in flatted tenements erected by needy speculators? The answer to this question is not far to seek, for we have been made acquainted with the results obtained through the operations of the Sanitary Protection Associations of Edinburgh, London, and other places. In London, we are informed that about six per cent of the houses inspected have their drains choked, so that the whole of the sewage oozes into the basement; in short, they have no real connection with the main or public sewers. Over thirty per cent of the whole houses inspected showed considerable leakage of sewer-gas through faulty pipes, as ascertained by the usual tests. We have every reason to believe that these astounding results are very considerably underestimated,

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and that not five per cent of the house-drains in our abodes are sewage and gas tight.

Now what does all this mean? It may be said to mean that sewage-sodden basements and houses which are, in virtue of their construction, little better than ventilating-shafts to the main drains, cannot be so very injurious to the health of the occupants, else all would suffer more or less, and many would die from the effects of the inhaled products of decomposition. We need not enter on the discussion of the medical question as to the connection of enteric, typhus, diphtheria, and other diseases with such insanitary conditions, as medical opinion on this subject is not quite unanimous; but we presume that few will deny that there is such a disease as systemic poisoning depending on the entrance, by some means or other, of the products of a certain kind of putrid decomposition into the circulation. Such insanitary conditions may prove a nidus for the propagation and dissemination of disease germs, such as those of typhus, typhoid, scarlet fever, diphtheria, cholera, and other diseases; but, apart altogether from such dangers, which can only be viewed in the light of an added quantity, we have a specific fever, which may be called drain fever, closely resembling typhoid in many of its symptoms. We may also have, and do have, such diseases as puerperal fever, erysipelas, etc., originating directly from defective drainage. It would be difficult to estimate the number of cases of illness, and of cases of illness resulting in death, due to such toxic influences; but we would expect to find more of them in such mansions as Bagshot Park than in humbler dwellings, as the more comfortably the mansion is heated up for the benefit of the invalid the more certainly will the sick chamber be converted into the ventilating shaft of a common sewer, or of the sewage-sodden soil of the basement.

An atmosphere polluted by sewer-gas, whatever its specific toxic influence may be, must mean an unhealthy atmosphere, specially so to the young, to the delicate, and to invalids, the degree of its unhealthiness being dependent on the conditions under which the sewer-gas is generated.

We may now consider the remedies proposed to meet these dangers.

1. No house should be occupied as a human habitation until the sanitary condition of the house, as regards drainage and other matters, has been tested by a competent inspector. We urgently need legislation on this subject, and it is to be hoped that a clause securing compulsory inspection of this kind may find a place in the next Public Health Act.

2. The inspection should be repeated after an interval of a year or so, as defective workmanship might stand the test of the first inspection. A clay-jointed pipe might pass muster at first, but the weakness would certainly be revealed in the course of a year.

3. The inspection should afterwards be periodic, as the best workmanship and material cannot be expected to endure forever.

There can be no doubt whatever that the best — indeed, we may say the only — security for work being properly done must consist in the knowledge that it will be submitted to an experimental test before being paid for. In regard to house-drainage, this experimental test should be insisted upon in every instance, not simply to save the proprietor from being defrauded, but to obviate exposure to hidden and unsuspected sources of danger to health and life. Were this condition insisted on, a better class of work would be turned out, and the result would be a lessened sick-rate.

As it is a well-known fact that very few houses are in a satisfactory condition as regards drainage, and that many are in a highly dangerous condition, proprietors of houses, or even tenants, should have their houses inspected. Proprietors of houses can be compelled to rectify conditions of defective drainage when they are proved to exist.

It would be extremely desirable to have legislation on this subject; but, as it is not at all probable that an amended Public Health Act will be passed for some years, those interested in such matters should protect themselves, and probably the best means of doing so, as a temporary measure at all events, would be by the formation of sanitary protection associations, after the plan proposed by Professor Fleeming Jenkin.

The formation of such associations may be objected to on the ground that their operations would interfere with the business of tradesmen who may be quite competent to make such experimental examinations; but, in so far as plumbers and those artificers who undertake the laying of house drains are concerned, the first result would be a very considerable stimulus to trade. No tradesmen can have any vested interest in matters affecting the public health, and no tradesmen who are anxious to turn out first-class work, and who profess to do so, can have any reasonable objection to having their work submitted to an experimental test. Nothing, indeed, could be easier than for a plumber to test his work before his pipes are covered over by boards and plaster, and neglect to do so is all the more inexcusable as it could be then done almost at no expense. — *The Sanitary Journal.*

MONTHLY CHRONICLE.

JUNE 1. Burning of a poorhouse at Oesthammer, Sweden. Twenty lives lost.

June 2. Death of Garibaldi.

June —. Death of John Scott Russell, F. R. S., designer of the "Great Eastern," and of the iron dome of the Vienna Exhibition building.

June 11. Rising against the Europeans at Alexandria, Egypt.

Death of Samuel H. Adams, a leading builder of Baltimore, Md.

June 14. A platform over Pogue's Run, Indianapolis, gives way during a flood. Ten persons drowned.

June 16. Gas explosion in the Diamond Mines at Wilkes Barre, Pa. One man killed, eight men injured.

June 17. Fall of a lead-laden floor at 63–65 Centre Street, New York. One man killed.

During a wind-storm the tower of St. Mary's Academy, at Leavenworth, Kan., is blown over onto a dormitory. Four girls killed, twenty injured.

Terribly destructive wind-storm strikes Grinnell, Malcolm, and other parts of central Iowa. Fifty-seven persons killed, three hundred injured.

June 18. Wind-storm strikes Bay City, Mich., doing much damage to buildings and killing several persons.

June 19. Wind-storm does much damage at South Royalton, Vt.

June 21. Cyclonic storms visit parts of Minnesota, northern Iowa, and western Wisconsin.

June 22. Fall of a building at Bloomington, Ill.

Confederate monument at Columbia, S. C., demolished by lightning.

June 23. Tidal wave on Lake Erie at Cleveland. One life lost. Damage $30,000.

June 24. Wind-storms strike Emmetsburg, Hosper, and Primghar, Io, and Muncie, Ind.

Cyclonic storms visit Nebraska, Illinois, Michigan, and Wisconsin.

June 26. Burning of a boarding-house at Manchester, N. H. Eight persons injured by jumping from the building.

Wind-storm passes over Bangor, Portland, and Lewiston, Me. One life lost.

Cyclonic storms visit Kansas.

June 27. Burning of an insane asylum at Dansville, N. Y.

June 30. Charles J. Guiteau is hung at Washington for the murder of President Garfield.

Destructive wind-storms at Coalville, Pa. Two killed, twenty-five injured.

Heavy wind-storms in central Iowa.

STRENGTH OF PORTLAND CEMENT-MORTARS.

BOSTON, July 3, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — Mr. Gustav Grawitz, in his communication in your issue of the 1st inst., quotes a statement of General Q. A. Gillmore, and some experiments made at Dresden, to prove the theory that Portland cement and lime should not be combined to form a mortar for building, in dry situations (as I understand him).

He does not, however, undertake to explain why the tests on brick piers built with bastard and cement mortars, made under my direction, with the finest testing machine in the world, tend to show the theory to be false.

It is true that I tested but one pier of a kind, but as the three piers built with bastard mortars were each stronger than similar piers laid in clear cement and sand, I do not think that the pier built with Portland cement and lime-mortar can be called an exceptional case.

According to the quotation made by Mr. Grawitz from Mr. Kuhn, it appears that the custom of mixing lime with Portland cement is an old one in Germany, and is "still held in some favor."

The experiments quoted would be very interesting indeed, if we had sufficient information concerning them to enable us to draw any conclusions respecting the strength of bastard mortars; but (not having the paper in which they were originally published) we do not know either the age of the specimens, the conditions under which they were allowed to harden, the form of the specimens, and the method of making the tests, or the brands of cement and lime used: hence we do not feel warranted in basing any conclusions upon them.

I should like to know how Mr. Grawitz can claim that the experiments he quoted show that "an addition of sand, when the lime was omitted, increased the value of the mortar." It seems to me that the table very clearly shows just the opposite to be the case.

If it is not advantageous to combine Portland cement and lime in mortars used in dry situations, it is very desirable that the fact should be known, but it seems to me that it will take more facts than have yet been given to prove it.

Very respectfully, F. E. KIDDER, C. E.

A CORRECTION.

BOSTON, July 5, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Since the publication in your paper of the tests on brown sandstones made under my direction, I have been informed by Mr. O. W. Norcross, of the firm of Norcross Brothers & Taylor, that the specimens of their stone designated in my report as McGregory stone were of the hard Saulsbury variety, as he selected the samples himself.

When preparing my report the foreman of the stone-yard informed me that the specimens were McGregory, which is the reason for my giving them that name.

I will state that the McGregory and hard Saulsbury stones are so much alike that it is very difficult to distinguish between them, even for one used to handling the stone. Respectfully yours,

F. E. KIDDER.

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NOTES AND CLIPPINGS.

Public Buildings. — More public building bills have been passed by this Congress so far than by any preceding Congress. Although the committee on public buildings and grounds of the last House reported favorably over fifty bills of this character, only five became laws. The following tabulated statement shows the various places where public buildings will be constructed, under the laws passed so far by this Congress, the amount appropriated for each, and the amount each will cost:

Name.	Amount appropriated.	Cost not to exceed
Concord, N. H.	$100,000	$200,000
Minneapolis, Minn.	6),0·0	175,000
Frankfort, Ky.	100,000	100,000
Peoria, Ill.	100,000	225,000
Denver, Col.	100,000	300,000
Pensacola, Fla.	200,000	200,000
Jackson, Tenn.	....	50,000
Detroit, Mich.	....	600,000
Lynchburg, Va.	....	100,000
Council Bluffs, Ia.	....	100,000
Quincy, Ill.	....	175,000
Galveston, Tex.	....	125,000
Hannibal, Mo.	....	75,000
Syracuse, N. Y.	....	200,000
Rochester, N. Y.	....	300,000
Louisville, Ky.	200,000	500,000
Columbus, O.	....	250,000
Erie, Pa.	100,000	150,000
Totals	$960,000	$3,825,000

A number of the public buildings, for which no appropriation was made in the bills authorizing their construction, will be provided for in the Sundry Civil Appropriation Bill, with sufficient money to purchase sites and begin work upon them this year, so that it is probable that the amount appropriated this session on account of public buildings will amount to at least $1,500,000. — *Boston Herald.*

Cremation and Crematories. — The cremation of Garibaldi, as prescribed in his last will and testament, having again called attention to the cremation question, the *Pall Mall Gazette* remarks: "The report of M. Georges Martin on 'the Proposition Cadet,' submitted to the Municipal Council of Paris contains the latest and most trustworthy information on the subject of cremation. M. Martin agrees with M. Cadet that cremation in a short time will be regarded as the only possible solution of a problem which in great cities is ever increasing in urgency; but he contents himself with proposing that for the present cremation should be rendered optional. The crematory, however, is as yet but in an early stage of development. Under the stimulus of competition it is probable a much nearer approach to perfection may be made than has yet been attained. The regenerative furnace of M. Siemens at Dresden only cost $250, and is one of the best yet invented. Combustion is effected by heated air, and the process is very rapid. The Brunetti crematory is complicated and slow. It takes four hours to consume a body, and necessitates a consumption of a hundredweight of wood. The most ghastly of all the apparatus of cremation is the Küborn, which is devised for use on the field of battle. In this dreadful machine as many as twelve bodies can be burned at one time, the operation lasting from an hour to an hour and a half. A dozen Küborns, working day and night, could dispose of two thousand five hundred corpses in twenty-four hours. Thirty years ago it was proposed to dispose of bodies by passing them into gas retorts, and since then many inventors have sought to use gas as the agent for reducing them to their elements. The apparatus of MM. Pollini and Clericetti, in which many cremations have taken place, is one of those in which gas is used, much on the principle of the ordinary gas-oven. The process is complete in an hour and a half, and the charge is twenty francs. On an altogether different principle is the crematory of Professor Paolo Gorimi, of Lodi. He professes to be able completely to destroy a human body in twenty minutes, at a cost of eight francs, by immersing in a chemical solution heated to a high temperature. The composition of this solution he keeps a strict secret, but chromic acid is believed to be one of its chief ingredients. The best known crematory in Europe is that erected by M. Keller in the cemetery of Milan. In this 'monumental crematory' two bodies can be consumed at a time without producing any odor. The process, which is completed in an hour, can be watched through small glazed openings, and at the close the survivors can carry home with them four or five litres of fine ashes weighing about sixty ounces. The cost varies from fifteen francs to twenty-five francs. The chief objections to cremation are those which are made by those who plead religious principles, and by those who lay stress upon the impossibility of procuring evidence as to poisoning after the victim has been cremated. The first objection is not serious, and in Italy, according to M. Martin, the clergy have already accepted the process, and are now seeking permission to place the funeral urns containing the ashes of the incinerated faithful within the walls of their churches. The difficulty as to poisoning is more important, and it undoubtedly constitutes an objection to the new system. But the cases in which poisoning is discovered by exhumation are few. Only three cases have occurred in Paris in eight years, and in two of them a close examination of the corpse, which would be obligatory before cremation, would have led to its detection. Many poisons are undiscoverable by exhumation, and others, such as arsenic, antimony, lead, etc., can be detected in the ashes of the crematory furnace or in the fumes which are given off in the process. At Milan the presence of arsenic in the ashes of poisoned dogs has been repeatedly discovered; but of course in cases where the surviving relative was the guilty party the ashes would not be allowed to remain for any time in the funeral-urn. On the whole, notwithstanding the pleas urged by its advocates, cremation can hardly fail to increase to a small degree the chances of a poisoner's escape."

An Odd Finish. — A new Congregational church at Quadrant, Highbury, England, has its interior timber-work entirely of pitch-pine, the outside left with saw-cut face, without varnish, and covered with Stockholm tar.

The Story of the Church of Folgoet. — The Church of Folgoet is, in truth, a magnificent edifice, but it offers no exception to the rule that in Brittany "the well-known forms of church architecture reappear, but with altered proportions and a peculiar grotesque stamp." It is built of the sharp dark-gray Kersanton stone, much used in Brittany, and the general effect, both without and within, is solemn and impressive. The carving on the western porch, with its delicate wreath of thistles and vine-leaves, and on the larger and more elaborate porch in the south transept, attributed to Anne of Brittany, as well as the sculpture on the jubé, or rood-loft, and the exquisite tracery of the windows, will reward a minute inspection. This long south transept projects like an aisle turned at right angles from the choir, which according to a plan not uncommon in Breton churches, does not extend eastward beyond it. Against the eastern wall stand five altars, three in the transept to the south of the high altar, which is beautifully sculptured in stone. The noble tower and spire at the northwestern end, about 170 feet high, — the southern tower is lower and terminates in a dome, — adds much to the dignity and grace of the building. A basin under an arched niche outside the eastern wall receives the water flowing from the miraculous fountain beneath the high altar, to which pilgrims still resort. At the west end of the nave, on the right of the entrance, is the chapel dedicated to the canonized idiot boy, Salaun, covered with mouldering frescoes. But the leading incidents of his life are depicted in bright colors on the wooden panels of the new pulpit, and the story, which explains how the church came to be built, may be read at length on a board suspended from one of the pillars. It will not be out of place to cite here the main points of a tradition which supplies so striking an illustration of native habits of belief. On the Sunday before All Saints, 1370, died the blessed Salaun or Solomon, commonly called the fool, because he was thought naturally foolish and destitute of reason, never having been able to learn anything but these two words, "Ave Maria," which he would continually repeat. This poor innocent had made himself a wretched abode under a tree with very low branches, which served him for roof and walls, and there he lived by himself, lying on the bare ground. When he was hungry he would go to Lesneven (about a mile off) and ask for bread, saying, "Ave Maria, Salaun a de pre bara," — which means, "Solomon would fain eat bread,"— and then he returned to his home and dipped his bread in a fountain close by, nor could he ever be induced to eat anything else or to sleep elsewhere. When he was cold in winter he used to climb the tree, and warm himself by swinging backward and forward from the branches, singing in a loud voice, "Oh Maria!" And so, from his simplicity, he came to be called "the fool." The record goes on to tell how, at last, when he died, he was refused Christian burial in consecrated earth, and laid by some peasants under his tree, "like a beast," without the rites of the Church. But the good and merciful God, to whom alone it belongs to judge of the end of all men, whether happy or miserable, made it plain, for the consolation of the poor and simple-minded, that Paradise is not only for those whom the world calls wise and understanding, and that the invocation of His holy mother is indeed a mark of predestination; for on the night after the burial of this innocent, there grew up miraculously from his grave a lily covered with flowers, though it was near winter time, and on the flowers and leaves were seen these words, as it were, traced and graven, "Oh Maria" and "Ave Maria," which remained till the leaves and flowers fell off. And the fame of this marvel brought together an immense multitude of clergy, nobility, and other folk from all quarters, who resolved to build on the site consecrated by so evident a miracle a church in honor of the glorious Virgin, the invocation of whose holy name had proved so effectual. — *The Cornhill Magazine.*

The Small Tun of Heidelberg. — The big tun of Heidelberg is not the biggest tun in the world. According to the *Suabian Mercury*, not only the largest, but the handsomest receptacle of the sort is to be found in the environs of Stutgart, at Ludwigsburg, the Versailles of Wurtemberg, where it is shown to favored visitors of the palace. The Ludwigsburg tun was made in 1719, of oak and pear-tree wood, by order of Duke Eberhard III, and is ornamented with carvings superior in beauty to those of its Badenese rival, constructed thirty-two years later. Its capacity is 300 Wurtemberg fuders, a liquid measure equal to 338 15 gallons, while that of the Heidelberg tun is set at 245. This would give the Heidelberg tun a capacity of something over 95,000 gallons, whereas Murray states its capacity at 800 hogsheads, or merely 43,200. Its size is 30 feet by 24 (height). The original big tun of Heidelberg was constructed by Michael Warner in 1589–91, of beams 27 feet long, and having a diameter of 18 feet, with 5 1-2 tons of iron hooping, and its capacity was set at 132 fuders, the fuder being called "four English hogsheads," though in reality the Baden fuder is 333.14 gallons, or more than six. It was this tun which Thomas Coryat saw in 1608 and described in his "Crudities."

Gold from the Soot of Mint Chimneys. — That some chimneys are better worth sweeping than others was incontrovertibly proved a few days ago at Berlin by the result of an experiment performed upon some soot with which the inside surface of an old flue, pulled down during the late alterations at the Royal Mint, was found to be thickly caked. This flue had served for many years as an outlet for the smoke given off by the furnaces in which the bullion undergoes fusion before its conversion into coinage, and it occurred to the architect superintending the repairs in question that it might be worth while to analyze the soot lining the chimney through which fumes of boiling gold and silver had passed in such quantities. The liquefaction of the less precious metal requires a temperature of 1,000 degrees Celsius, while that of gold cannot be effected under 1,250 degrees. It is usual to bestrew the surface or these metals, when in a liquid state, with charcoal, in order to hinder evaporation; but at such a fierce heat as that above indicated, some evaporation is bound to take place, and its results were made manifest by the yield of four pounds' weight of pure gold, valued at something under 4,000 marks, obtained from the soot that was scraped off the inside of the melting-room chimney in question. — *London Daily Telegraph.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

260,001. FIRE-ESCAPE.—William H. Burden and Frederick C. Burden, Cleveland, O.

260,005. LATHE-CHECK.—Loring R. Davis, Adrian, Mich.

260,012. VENTILATOR.—John M. Fennerty, Memphis, Tenn.

260,015. PILE FOR USE IN THE CONSTRUCTION OF WHARVES AND OTHER STRUCTURES.—Robert M. Franklin, Galveston, Tex.

260,017. AUTOMATIC SAFETY-STOP FOR ELEVATORS.—Jas. P. Freeman, Chicago, Ill.

260,019. GAUGE FOR SAWING ELLIPSES.—William H. Gordon, and Philip J. Boost, Detroit, Mich.

260,030. FAUCET.—John H. Johnson, Chicago, Ill.

260,036. LOCK-HINGE FOR SHUTTERS.—John P. Maher, Reading, Pa.

260,044.—SPRING CURTAIN-ROLLER.—James M. Osgood, Somerville, Mass.

260,045. SPRING CURTAIN-ROLLER.—James M. Osgood, Somerville, Mass.

260,046. STEAM-HEATER.—William H. Page, Norwich, Conn.

260,064. BATH-TUB ATTACHMENT.—Friedrick Schutte, Philadelphia, Pa.

260,097. APPARATUS FOR SUPPLYING STEAM IN CITIES.—Birdsill Holly, Lockport, N. Y.

260,135. SCREW-DRIVER.—James Swan, Seymour, Conn.

260,152. MATERIAL FOR THE DECORATION OF THE INTERIOR WALLS AND CEILINGS OF BUILDINGS.—Frederick Beck, New York, N. Y.

260,161. SASH-CORD FASTENER.—Charles Bush, New York, N. Y.

260,184. DRY-KILN.—Edward M. Flaherty, New Baltimore, Mich.

260,192. FIRE-EXTINGUISHING APPARATUS.—Almon M. Granger, Boston, Mass.

260,199. VENTILATING ATTACHMENT TO HEARTHS.—J. E. Howard, Grape Vine, Tex.

260,203. COMPOUND FOR MAKING BRICK, TILE, ETC.—Henrey H. Hunt, San Antonio, Tex.

260,213. SASH-HOLDER AND FRAME.—Casper Loewenstein, Columbus, O.

260,217. BASIN-BIB.—Eugene O. McGlauflin, San Jose, Cal.

260,229. FIRE GUARD AND ESCAPE.—John O'Neil, Pakenham, Ontario, Can.

260,232. WATER-CLOSET.—Stewart Peters and William Donald, Glasgow, Scotland.

260,245. FIRE-ESCAPE.—Diedrich Schmidt, New York, N. Y.

260,252. AUTOMATIC FIRE ALARM AND EXTINGUISHER.—Daniel C. Stillson, Somerville, Mass.

260,254. ELEVATOR.—George C. Tewksbury, East Orange, N. J.

260,261. ELEVATOR.—Peter H. Walsh, New York, N. Y.

260,271. SASH-FASTENER.—Ewell B. Attwell, Leesburg, Va.

260,292. MONKEY-WRENCH.—Jonas S. Greenleaf, Fargo, Dak.

260,294. SKYLIGHT.—Conrad Hefele, Baltimore, Md.

260,324. HOISTING APPARATUS.—Walter S. Rockwell, New York, N. Y.

260,331. TENONING-MACHINE.—Jeremiah Shetler, Taylorville, Ill.

260,347. DOOR-KNOB.—John Collins, Newark, N.J.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—Since our last report eighteen permits have been granted, of which the following are the more important:—

Geo. W. Braden, three-st'y brick building, Tyson Alley, bet. Madison and Richmond Sts.

T. B. Twine, 12 three-st'y brick buildings, Franklin St., commencing at the s w cor. of Mount St.

T. B. Twine, 15 three-st'y brick buildings, Fulton Ave., commencing at the n w cor. of Tamant St.

Marchant & Reilly, one-st'y brick building, 18' x 48', n w cor. Orchard and Tessier Sts.

R. A. Shipley, 2 two-st'y brick buildings, Gilmor St., commencing at cor. of Calhoun St.

Betty Adler, two-st'y brick building, Regester St., bet. Lancaster and Aliceanna Sts.

C. Demling, two-st'y brick building, Castle St., bet. Monument and Madison Sts.

Hippolyte Dalmon, 6 three-st'y brick buildings, Smith St., bet. Myrtle Ave. and Shields Alley.

Wm. Gesford, 2 two-st'y brick buildings, Vincent Alley, s of Lanvale St.

T. C. Lang, three-st'y brick building and two-st'y brick stable, s w cor. Light St. and Williamson Alley.

Boston.

BUILDING PERMITS.—*Wood.—Sherman St.*, junction of Fred St., Ward 4, for the American Carpet Lining Co., manufactory of black lead, 65' x 78' and 111'; Berry N. Moody, builder.

Albany St., Nos. 760-770, Ward 18, for George Curtis, storage of lumber, 42' x 173'; George Curtis, builder.

Edgewood St., No. 21, for Charles E. Currier, dwell., 22' and 23' x 30', two-st'y; Charles E. Currier.

Bird St., near Virginia St., Ward 20, for W. H. Saywood, 2 dwells., 20' x 35'.

Monadnock St., near Bird St., 5 dwells., 30' x 35', two-st'y; W. H. Saywood, builder.

Old Harbor Point, Ward 24, for City of Boston, stone cutter shed, 15' x 150' and 184'; Thomas Keyes, builder.

Wales St., near Howard St., Ward 24, for Charles Newhall, dwell., 15' 4" and 22' 4" x 50' 4", two-st'y; Chas. E. Currier, builder.

Brick.—Eastern Ave., near A St., Ward 13, for Boston Wharf Co., storage of wool, 100' x 103', four-st'y; W. S. Wilbur, builder.

Parker St., rear of, near West Chester Park, Ward 22, for Ham & Carter, storage of building materials, 30' x 50'; G. H. MacKay, builder.

Oliver St., No. 123, Ward 12, for Nathaniel Whiting heirs, dwell. and office, 18' x 28' x 30' 3", two-st'y; Rumery & Maxwell, builders.

Hanover St., Nos. 298-302, Ward 6, for John Miller, mercantile, 34' and 36' 6" x 55', four-st'y; Donahoe Bros., builders.

Brooklyn.

BUILDING PERMITS.—*De Kalb Ave.*, n s, 250' e Evergreen Ave., 5 two-st'y frame dwells.; cost, $1,800 each; owner, S. J. Morehouse, 516 Lexington Ave.; architect and builder, D. B. Morehouse.

Vanderbilt Ave., w s, 236' 6" n De Kalb Ave., two-st'y brick stable; cost, $5,000; owner, Frederick Lemmerman, Clermont Ave., near De Kalb Ave.; architect and carpenter, F. D. Norris; mason, Thos. Dorlen.

Schermerhorn St., Nos. 75, 77 & 79, n s, 175' w Boerum Pl., three-st'y factory; cost, $6,000; owner, Rufus Litchfield, 185 Schermerhorn St.; architect, Charles Werner.

Halsey St., s s, 305' w Stuyvesant Ave., two-st'y and basement brick dwell.; cost, $3,800; owner and builder, John A. Sutton, 707 De Kalb Ave.; architect, J. D. Reynolds.

Adams St., n s, 100' e Broadway, 5 two-st'y frame dwells.; cost, $2,500 each; owner and builder, Conrad Guthart, 23 Adams St.; architect, Th. Engelhardt.

Sixth St., n s, 295' e Third Ave., 2 three-st'y frame tenements; cost, each, about $2,500; owner, John Andrews, 89 Second Pl.; architect, W. Wirth; builder, J. R. Greene.

Kosciusko St., s s, between Throop and Sumner Aves., two-st'y brick school; cost, $23,000; owner, Board of Education; architect, J. W. Naughton; builders, P. J. Carlin and P. F. O'Brien.

Ninth St., n s, 58' w Sixth Ave., three-st'y brownstone dwell.; cost, $4,000; owner, John Fey, 189 Twelfth St.; architect, F. Ryan.

Raymond St., e s, between Hanson Pl. and Lafayette Ave., one-st'y brick stable; cost, $2,500; owner, E. Waters, on premises; architect, G. W. Anderson; mason, J. D. Anderson.

Washington Ave., w s, 325' s Greene Ave., 2 three-and-a-half-st'y brick dwells.; cost, each, $11,000; owner and carpenter, D. H. Fowler, 14 Verona Pl.; architects, A. Hill and Thos. Baker.

North Sixth St., n s, 125' w Sixth St., four-st'y frame tenement; cost, $5,000; owner, John Costello, 207 North Sixth St.; architects, Cardwell & Hawkins.

ALTERATIONS.—*Gates Ave.*, n s, between Clason Ave. and Franklin Ave., 2 one-st'y brick extensions; cost, $7,500; owner, Church of the Reformation, on premises; architect, John Mumford; builders, J. H. Stevenson and H. J. Smith.

Pierrepont St., cor. Columbia Heights, alter pitch of roof, interior alterations, stairs, etc.; one-st'y brick extension; cost, $10,000; owner, Seth Low, 112 Willow St.; architects, Parfitt Bros.; builders, W. & T. Lamb, Jr., and Martin & Lee.

Schermerhorn St., No. 192, cor. Hoyt St., two-st'y brick extension, etc.; cost, $5,000; owner, Mrs. J. H. Recknagel, on premises; architect, A. F. D'Odench; builders, J. H. Stevenson and Morris & Selover.

Broadway, s w cor. Thornton St., raised 3', also one-st'y frame extension, fronts rebuilt, etc.; cost, $3,000; owner, E. Michaelis, on premises; architect, E. Dennis; builders, B. J. Dennis & Son.

Chicago.

HOUSES.—J. V. Farwell will build on Lake Shore Drive, n of Chicago Water-Works, 65' x 80', brownstone on all sides; Burnham & Root, architects. They have also in hand plans for a residence on Michigan Ave., near Twenty-ninth St., for Mr. Sidney Kent, of pressed brick.

BOARD OF TRADE BUILDING.—The contracts have been let for the foundations for the new Board of Trade Building to E. Sturtevant.

BUILDING PERMITS.—A. Wygant, two-st'y brick dwell., 20' x 50', 537 West Jackson St.; cost, $8,000.

John Meyer, two-st'y brick dwell., 22' x 60', 460 Congress St.; cost, $5,000.

Charles L. Willoughby, three-st'y and basement brick dwell., 38' x 48', 292 and 293 Michigan Ave.; cost, $18,000.

Daniel Burke, 4 two-st'y and basement brick dwells., 2233 to 2239 Wentworth Ave; cost, $15,000.

Marshal Field, one-st'y brick store, 60' x 163', 772 and 778 Wabash Ave.; cost, $8,000.

Frank Grundes, two st'y and basement brick dwell., 23' x 50', 43 North Ada St.; cost, $3,000; H. Van Pelt, architect.

P. H. McDonald, two-st'y and basement brick dwell., 20' x 47', 214 East Illinois St.; cost, $4,000.

F. Leeper, two-st'y and basement brick dwell., 24' x 62', 817 West Twenty-second St.; cost, $5,000.

Rev. F. Suebert, three-st'y and basement brick dwell., 42' x 42'; Market St., near Hill St.; cost, $8,000.

John Wilkie, two-st'y and basement brick dwell., 21' x 42', 3753 Butterfield St.; cost, $2,500.

Jos. Halorka, one-st'y brick cottage, 20' x 50', 92 Johnson St.; cost, $2,500.

Wm. Andres, two-st'y and basement brick dwell.; 37' x 40', 3803 and 3805 Lake Ave.; cost, $5,000.

J. E. Lindley, three-st'y and basement brick dwell., 44' x 70', 2635 and 2637 Michigan Ave.; cost, $16,500.

P. J. Blake, two-st'y brick dwell., 22' x 50', 137 Superior St.; cost, $3,000.

L. Hodges, four-st'y and basement brick store and dwell., 30' x 60', 2133 Indiana Ave.; cost, $10,000.

Mrs. M. T. Nixon, three-st'y and basement brick flats, 22' x 80', 261 Illinois St.; cost, $6,000.

Anton Dasletzki, two-st'y and attic brick dwell., 23' x 54', 165 Centre St.; cost, $3,300.

E. B. Sheldon, two-st'y brick dwell., 20' x 38', 18 Lincoln Ave.; cost, $5,500.

Mrs. A. Johnson, three-st'y brick dwell., 40' x 49', 655 Robey St.; cost, $7,000.

Wm. P. Allgunn, two-st'y and basement brick dwell., 20' x 50', 598 East Division St.; cost, $4,500.

St. Mark's Episcopal Church, one-st'y brick addition to church, 33' x 50', Cottage Grove Ave. and Prospect St.; cost, $5,000.

W. Meyer, two-st'y and basement brick dwell., 21' x 53', 334 West Huron St.; cost, $3,000.

H. H. Berven, two-st'y brick flats, 25' x 60', 3556 Forest Ave.; cost, $5,000.

H. Licht, two-st'y and basement brick store and dwell., 24' x 75', 644 Centre Ave.; cost, $4,000.

Joseph Charnley, two-st'y brick dwell., 43' x 48', on Division St. and Lake Shore; cost, $9,000.

Cincinnati.

BUILDING PERMITS.—Since the last report the following building permits have been issued:—

Val Roth, two-st'y brick dwell., Pleasant St., bet. Fifth and Liberty Sts.; cost, $3,500.

David Sinton, to alter and repair the Grand Opera House; cost, $20,000.

Henry Kester, addition to four-st'y dwell., Elm St., near Pearl St.; cost, $3,000.

Phillip Le Saint, two-st'y brick dwell., Elm St., near Third St.; cost, $4,000.

H. Ennebeck, three-st'y brick dwell., 139 Bamm St.; cost, $5,000.

Cincinnati Corrugating Co., two-st'y brick, Culvert St., near Eighth St.; cost, $3,000.

Five permits for repairs; cost, $1,400.

New York.

CHURCH.—The laying of the corner-stone of the Baptist Church of the Epiphany, at Madison Ave. and Sixty-fourth St., took place June 27. After a prayer by the Rev. Lemuel Covell, the pastor, the Rev. Dr. Joseph F. Elder made an historical address. The church is to extend 132' in Sixty-fourth St. and 80' in Madison Ave., having a seating capacity of 1,000. It is estimated to cost $212,000.

BUILDING PERMITS.—*Stanton St.*, n e cor. Willett St., five and one st'y brick store and tenement; cost, $22,500; owner, estate of P. Dater, P. Dater, Jr., exr., Cheyenne, Wyoming Territory; attorney, J. B. Greenman, Room 52, Bible House; architect, W. Jose.

Madison Ave., One Hundred and Twenty-ninth and One Hundred and Thirtieth Sts., begins One Hundred and Twenty-ninth St., n e cor. Madison Ave., one-st'y stone basement for church; cost, $3,400; owner, All Saints Church, One Hundred and Thirtieth St. and Madison Ave.; architect, James Renwick; builders, Giblin & Lyons and P. Walsh.

Fortieth St., s s, 125' e Eleventh Ave., four-st'y brick tenement; cost, $10,000; owner, Andrew Ewald, 432 West Fifty-first St.; architects, Thom & Wilson.

One Hundred and Twenty-sixth St., s s, 135' e Third Ave., five-st'y brownstone apartment-house; cost, $20,000; owner and builder, Stephen J. Wright, 201 West One Hundred and Thirtieth St; architects, Thom & Wilson.

Eighty-third St., w s, 100' e Madison Ave., 4 five-st'y brownstone dwells.; cost, $15,000; owner, James McManus, 232 East Eighty-third St.; architect, Fr. S. Barus.

Eagle Ave., s e cor. Cedar St., Melrose (One Hundred and Fifty-eighth St.), two-st'y frame dwell.; cost, $2,500; owner, Herman Weissker, Eagle Ave., near Cedar St.; architect and carpenter, Henry Piering; mason, Adam Kaiser.

St. Ann's Ave., e s, 100' s John St., 2 two-st'y frame dwells.; cost, each, $4,000; owner, Philip Ebling, One Hundred and Fifty-sixth St. and St. Ann's Ave.; architect, Henry Piering; builder, Adam Kaiser.

Water St., n e cor. Broad St., four-st'y brick store and tenement; cost, $13,000; owner, B. C. Gaideker, 1859 Second Ave.; architect, Henry Piering.

Sixty-first St., n s, about 68' e Tenth Ave., one-st'y brick maternity for New York Infant Asylum; cost, $2,100; owners, Trustees New York Infant Asylum, 7 West Thirty-ninth St.; architect, J. E. Terhune.

Thirteenth Ave., n e cor. Bank St., five-st'y factory; cost, $80,000; owner, Mrs. G. R. Hoffman, 4 Warren St.; architect, John B. Snook; builders, Benj. Blackledge and David Hepburn.

Leonard St., No. 134, four-st'y brick warehouse; cost, $10,000; owner, Catharine A. Cammann, 19 East Thirty-third St.; H. H. Cammann, agent, 4 Pine St.; architects, O. P. & R. F. Hatfield.

Stanton St., No. 226, three-st'y brick dwell.; cost, $14,000; owner, Jeannette Gunther, 228 Stanton St.; architect, Edward Kenny; builders, John Fish and Timothy Wallis.

East Forty-seventh St., No. 216, five-st'y brick tenement; cost, $9,000; owners, Peter McCormack and James J. Dunne, 164 East One Hundred and Twenty-Eighth St.; architect, A. Spence; builders, McCormack & Dunne.

East Forty-seventh St., No. 218, five-st'y brick tenement; cost, $12,000; owner, architect and builder, same as last.

West Twenty-ninth St., No. 540, five-st'y brick tenement; cost, $11,000; owner, architect and builder, same as last.

Battery Pl., extending from Broadway to Greenwich St., eleven-st'y brick and Belleville stone offices; cost, $900,000; owner, Washington Building Co., New York, 120 Broadway; architect, Edward H. Kendall; masons, W. H. Hazzard & Son; iron, J. B. & J. M. Cornell.

Lexington Ave., n w cor. Eighty-second St., 2 four-st'y brick dwells.; cost, $5,000 each; owner, E. Emmett, Connecticut.

Mercer St., No. 185, six-st'y brick store and factory; cost, $35,000; owner, E. P. Gleason, 171 Remsen St., Brooklyn.

Thompson St., No. 15, rear, four-st'y brick paint-shop; cost, $3,000; owner, Nicholas Serf, 15 Thompson St.; architect, Wm. Graul.

Ave. A, e s, from Twenty-third to Twenty-fourth St., one-st'y frame ferry-house; cost, $20,000; owner, Greenpoint Ferry Co., Greenpoint, Brooklyn, E. D.; architect, John McIntyre.

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Rivington St., No. 265, five-st'y brick tenement; cost, $10,000; owner, Louis Bottiger, 64 Pitt St.; architect, Julius Boekell.

Ninth Ave., No. 320, e s, 98′ 9″ s Twenty-ninth St., two-st'y brick stable and dwell.; cost, $5,000; owner, Nathaniel E. Baylies, 363 West Twenty-eighth St.; architects, Hamilton & Pistor.

One Hundred and Twenty-first St., s s, 289′ w Ave. A, 2 four-st'y brownstone tenements; cost, $9,500 each; owner, Joseph Dillon, 71 West Forty-eighth St.; architect, John Sexton.

East One Hundred and Fourteenth St., No. 326, four-st'y brick tenement; cost, $9,000; owner, Mrs. Sarah Amor, on premises; architect, John McIntyre; builder, G. J. Fernchild.

Eighty-second St., s s, 60′ w Second Ave., three-st'y Connecticut brownstone dwell.; cost, $10,000; owner, Christian Briel, 246 East Eighty-second St.; architect, John McIntyre.

One Hundred and Nineteenth St., n s, 20′ w Lexington Ave., 4 four-st'y brick tenements; cost, $9,000 each; owner, Enoch C. Bell, 123 East One Hundred and Fourteenth St.; architect and mason, T. Fealey.

East Eighteenth St., Nos. 513, 515, 517 *and* 519, one-st'y brick machine shop; cost, $4,000; owners, New York Steam Co., W. C. Andrews, President, 16 Cortlandt St.; engineer and architect, Chas. E. Emery.

One Hundred and Eighth St., n s, 105′ e Fourth Ave., 5 four-st'y brick tenements; cost, each, $13,000; owner, Michael Duffy, 156 East One Hundred and Second St.; architect, Andrew Spence.

East Thirtieth St., No. 3, rear, two-st'y brick work-shop; cost, $2,900; owner, Margaret Eagan, 3 East Thirtieth St.; builder, R. H. Casey.

Stanton St., n s, 25′ e Willett St., five-st'y brick and brownstone tenement, cost, $17,500; owner and carpenter, same as last.

Third Ave., n w cor. One Hundred and Thirty-ninth St., three-st'y brick store and dwell.; cost, $4,500; owner, Phillippina Brown, one Hundred and Thirty-ninth St. and Third Ave.; architect, J. F. Burrows.

One Hundred and Forty-seventh St., s s, 150′ w St. Ann's Ave., two-st'y frame dwell.; cost, $2,200; owner, Edward Betzig, St. Ann's Ave., One Hundred and Forty-ninth St.; architect and builder, Henry Piering.

Lexington Ave., s e cor. One Hundred and Twelfth St., 5 five-st'y brick tenements; cost, corner, $16,000; others, each, $24,000; owners, Thomas Smith and John Bannen, 145 East One Hundred and Eleventh St.; architects, Babcock & McAvoy.

Broadway, n w cor. Eightieth St., 3 three-st'y brick stores and dwells.; cost, about $3,000 each; owner and architect, Christian Blinn, Ninth Ave., n w cor. Seventy-ninth St.

West Thirty-ninth St., No. 519, two-st'y brick dwell.; cost, $3,200; owner, George Blinks, on premises; architect, C. F. Ridder, Jr.

One Hundred and Forty-second St., s s, 90′ w Brook Ave., 9 two-st'y brick dwells.; cost, each, $4,000; owner, Julia O'Gorman, Willis Ave. and One Hundred and Thirty-eighth St.; architect and builder, Wm. O'Gorman.

Second Ave., e s, 75′ 7″ s One Hundred and Eighteenth St., four-st'y brownstone store and tenement; cost, $12,500; owner, Thomas Dunn, First Ave., e s, between One Hundred and Fifth and One Hundred and Sixth Sts.; architect, F. T. Camp.

Fifth Ave., s e cor. Seventy-fourth St.; four-st'y brick and brownstone dwell.; cost, $250,000; owner, Wilhelm Pickhardt, 735 Madison Ave.; architect, H. G. Harrison; mason, Thos. Dobbins.

Fifth Ave., s e cor. Sixty-sixth St., 2 four-st'y brick and stone dwells.; cost, $50,000 and $80,000; owner, Andrew J. White, 24 East Sixty-seventh St.; architect, J. E. Ware; builders, Sinclair & Wells.

West Twenty-seventh St., Nos. 39 *to* 45, ten-st'y brick and brownstone apartment-house and restaurant; cost, $180,000; owner, Louis L. Todd, 17 West Twenty-sixth St.; architect, A. Hatfield; builder, Hugh Getty.

Seventy-sixth St., s s, 300′ w Ave. A, 2 five-st'y brick tenements; cost, $5,000; owner, Eva Muller, Seventy-sixth St., East River; architect, John Brandt.

Ninety-second St., s e cor. Ninth Ave., 4 five-st'y brick and brownstone flats; cost, corner, $40,000; others, each, $16,500; owner, John D. Crimmins, 40 East Sixty-eighth St.; architects, D. & J. Jardine.

One Hundred and Twenty-sixth St., s s, 100′ e Ninth Ave., 4 four-st'y brick tenements; cost, each, $10,500; owner, W. K. Foster, 760 Lafayette Ave., Brooklyn; architect, S. M. Styles.

West Fiftieth St., No. 537, four-st'y brick tenement; cost, $8,000; owner, Jacob Schneider, 411 West Fiftieth St.; architect, J. M. Forster.

Fiftieth St., No. 537, rear, three-st'y brick factory; cost, $5,000; owner and architect, same as last.

One Hundred and Fifty-second St., n s, 675′ w Eleventh Ave., two-st'y frame dwell.; cost, $3,500; owner, James Britt, One Hundred and Fiftieth St., near St. Nicholas Ave.; architects, D. & J. Jardine.

Fourth Ave., s w cor. Fiftieth St., six-st'y brick and Potsdam stone college; cost, $100,000; owners, Trustees Columbia College, 5 Church St.; architect, Charles C. Haight; mason, J. Bogert; carpenter, not selected.

Ninth Ave., n e cor. Seventy-third St., five-st'y brick and Nova Scotia stone tenement; cost, $35,000; owner, Edward Clark, 34 Union Sq.; architect, H. J. Hardenbergh; builder, John Banta.

Seventy-third St., n s, 30′ e Ninth Ave., 19 four-st'y brick and stone dwells.; cost, each, about $15,000; owner, architect and builder, same as last.

Seventy-third St., n s, 420′ e Ninth Ave., 8 four-st'y brick and Nova Scotia stone dwells.; cost, each, $18,000; owner, architect and builder, same as last.

Alexander Ave., between One Hundred and Thirty-fourth St. and Southern Boulevard, and 31′ on One Hundred and Thirty-fourth St., and 331′ on Southern Boulevard, 24 four-st'y brick and free-stone stores and tenements; cost, each, $8,500; owner, Henry C. Thompson, 1684 Lexington Ave.; architect, Wm. Baker.

Eighty-sixth St., n s, 75′ e Ave. A, four-st'y brick apartment-house; cost, $15,000; owner, Charles E. Hall, 520 East Twentieth St.; architect, John C. Burne.

East One Hundred and Ninth St., Nos. 314 *and* 316, 2 four-st'y brick tenements; cost, each, $9,000; owner and builder, Joseph Handwerk, 174 East One Hundred and Twelfth St.; architect, Bart. Walther.

Fifty-ninth St., n s, 250′ w Ninth Ave., 7 five-st'y brownstone flats; cost, each, $16,000; owner, R. H. Treacy, 1716 Madison Ave.; architect, R. Rosenstock.

Seventy-first St., s s, 72′ w Second Ave., five-st'y Connecticut brownstone tenement; cost, $16,000; owner, John Livingston, 981 Lexington Ave.; architect, F. T. Camp.

ALTERATIONS. — *West Fifteenth St., No.* 313, three-st'y brick extension; cost, $3,500; owner and builder, Lewis H. Williams, 350 West Nineteenth St.; architect, D. Lienan.

West Sixty-third St., No. 408, two-st'y brick extension and interior alterations; cost, $2,000; owner, architect and builder, William Johnson, on premises.

East Nineteenth St., No. 37, one-st'y iron and brick extension, whole rear of main rebuilt; cost, $10,000; owner, Alfred Bridgeman, 876 Broadway; architect, Paul Beck; builders, A. Woodruff's Sons and John Downey.

East Tenth St., No. 210, raised one st'y, also five-st'y brick extension, altered for apartment-house; cost, $16,500; owner, Mrs. Fannie J. Stuyvesant, 46 West Thirty-seventh St.; architect, S. D. Hatch; builders, John Askey and A. Gibbins.

West Fiftieth St., No. 114, two-st'y brick extension; cost, $2,000; attorney for owner, John Drake, 79 Cedar St.; architect, W. E. Bloodgood; builders, F. Bloodgood and J. C. Doremus.

Third Ave., No. 39½, cor. Twenty-eighth St., two-st'y brick extension, interior alterations; cost, $3,500; lessee, S. A. Thompson, 278 Third Ave.; builders, Brice & Hunter.

Baxter St., No. 44 rear, one-st'y brick extension; cost, $2,000; owner, Annie Cohn, 206 East Broadway; architect and builder, W. Powers.

West Forty-third St., Nos. 251, 253 *and* 255, two-st'y brick extensions; cost, $2,200; owners, Forty-third-street Methodist Episcopal Church; D. Teets, President, on premises.

North Washington Sq., No. 22, raise extension one st'y, interior alterations; cost, $12,000; owner, Mrs. Louisa Minturn, Elberon, N. J.; architect, Jas. Renwick; builders, J. J. Tucker and Edward Gridley.

West Fiftieth St., No. 24, two-st'y brick extension, etc.; cost, $3,000; owner, Mrs. R. P. Herrick, on premises; builders, P. Canfield and McKenny & Scrafford.

Liberty St., Nos. 28 *to* 36, raised one st'y; cost, about $7,000; owner, Frederick J. Stone, 55 Liberty St.; architect, J. Renwick; builders, F. Lyon's Son and E. Gridley.

Eagle Ave., n e cor. One Hundred and Sixty-first St., raised 3′ 6″, interior alterations; cost, $2,500; owner, Robert Clark, One Hundred and Sixtieth St. and Eagle Ave.; architects and builders, P. Garvin & Son.

Madison Ave., n e cor. Thirty-fifth St., church, repair damage by fire, interior alterations; cost, $50,000; owner, John L. Riker, Vestryman Church of Incarnation, 19 West Fifty-seventh St.; architects, D. & J. Jardine; builder, E. Smith.

Fourth Ave., w s, 121′ 8″ s Fiftieth St., raise two stories; part of front and rear walls rebuilt, etc.; cost, $30,000; owners, Trustees Columbia College, 5 Church St.; architect, C. C. Haight; mason, J. Bogert; carpenter, not selected.

East Forty-fifth St., No. 17, three-st'y brick extension; cost, $3,000; owner, Robert A. Chesebrough, on premises; architect, W. Kuhles; builder, F. Schaettler.

West Fifty-fourth St., No. 40, two-st'y brick extension; cost, $2,500; owner, Clara Brice, 40 West Fifty-fourth St.; architects, D. & J. Jardine.

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PROPOSALS.

ELEVATORS.

[At Cincinnati, O.]

AUDITOR'S OFFICE,
HAMILTON COUNTY, OHIO.
CINCINNATI, June 17, 1882.

Sealed proposals will be received at the office of the County Commissioners of Hamilton County **until 12 o'clock, July 12, 1882**, for the building of two passenger elevators in the court-house, as per general specifications on file in the office of the County Commissioners; also, bids for the building of two towers to receive said elevators, according to plans and specifications on file in said Commissioners' office.

Bids for said elevators and towers may be joint or separate, and all bids for elevators must be accompanied with full drawings, plans and specifications, and must designate the safety attachment that will be used on the elevators proposed.

The work to be completed within ninety days from the date of contract.

The right to reject any or all bids is reserved.

W. S. CAPPELLER,
441 County Auditor.

RAILWAY SHOPS.

[At South Chicago, Ill.]

OFFICE OF CHIEF ENGINEER NEW YORK, CHICAGO AND ST. LOUIS RAILWAY,
CLEVELAND, O., June 26, 1882.

Sealed proposals will be received at the office of J. A. Latcha, Chief Engineer, directed to the New York, Chicago & St. Louis Railway, **until 12 o'clock, noon, Wednesday, July 12, 1882**, for furnishing all material and performing all labor necessary for constructing the general shops of this company at South Chicago.

Plans and specifications for said work will be on file at Room 55, Metropolitan Block, Chicago, Ill., on and after Monday, July 3, 1882.

Each proposal must contain the full name of the party or parties making the same.

The New York, Chicago & St. Louis Railway Company reserve the right to reject any or all bids.

J. A. LATCHA,
341 Chief Engineer N. Y., C. & St. L. Ry.

PROPOSALS.

INSANE ASYLUM.

[At Columbus, O.]

Sealed proposals will be received by the Trustees of the Ohio Institution for the Feeble-minded Youth, at the office of the Superintendent, at Columbus, Ohio, **until Monday, July 31, 1882, at 12 o'clock**, for work and material required for the construction of the central building and wings of that institution. Proposals will be received: —

For all brick.
For all cement.
For laying all bricks in the walls, including those now on hand from the burnt building.
For all cut-stone work, including setting of all cut stones saved from the burnt building.
For all carpenter-work and material.
For all slate, tin and galvanized iron-work.
For all plastering necessary, and wire or iron lathing.
For all concrete work.
For all painting and glazing.
For all iron-work, such as beams, roofing, etc., delivered upon the ground ready to put up.
For putting all iron-work complete upon the buildings.
For all corrugated-iron arches, brick and hollow tile arches between floor-beams.
For all iron stairs, iron division doors, etc.
For all gas-fittings and material.
For all material and labor of plumbing.
For all material and labor of steam-fitting.

Bidders are required to bid also for all material remaining of the burnt buildings suitable for use in rebuilding them, viz.: brick and cut stone and material for concrete.

Plans, specifications and detailed drawings can be seen at the office of the Superintendent at the Institution.

All proposals will be directed to Hon. John A. Shank, President of the Board of Trustees, and indorsed proposals for stating kind of work or material proposed for.

The Board reserves the right to reject any or all proposals.

JOHN A. SHANK,
JOHN M. HOLMES,
M. A. DAUGHERTY,
J. K. RUKENBROD,
B. B. WOODBURY,
} Trustees.
243

WATER-WORKS.

[At Northboro, Mass.]

Proposals for furnishing, laying and setting water-pipes, special castings, gates and hydrants for the Northboro Water-Works, will be received by the Water Commissioners **until Thursday, July 13, 1882, noon.** Specifications and blanks can be obtained by addressing CYRUS POTTER,
Pres. Board of Water Commissioners,
Northboro, Mass.

PERCY M. BLAKE, Engineer. 341

IRON STAIRWAY.

[At New York, N. Y.]

Sealed proposals will be received by the School Trustees of the Eighth Ward at the hall of the Board of Education **until July 10, 1882**, for an iron stairway for Primary School Building, No. 25. For full information see *City Record*, for sale at No. 2 City Hall.

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WATER-WORKS.

[At Fremont, O.]

FREMONT, June 22, 1882.

Sealed proposals will be received by the Trustees of Water-works of the City of Fremont, O., at their office in said city **until 12 o'clock, noon, of Tuesday, the 25th day of July, 1882**, for furnishing on board cars in Fremont approximately:

3,400	lineal feet of	16	inch	pipe,	
5,600	" "	12	"	"	
4,600	" "	10	"	"	1,400 tons.
5,600	" "	8	"	"	
26,700	" "	6	"	"	
10,200	" "	4	"	"	

Also, 18 tons of special castings.

Also, for furnishing lead and gaskets and laying said pipe, including trenching and back-filling, setting hydrants and valves, including the furnishing and setting valve-boxes, vaults and covers.

Also, for furnishing ninety-five hydrants.

Also, for furnishing valves as follows: Three 16-inch; three 12-inch; five 10-inch; eight 8-inch; forty-five 6-inch, and twenty-seven 4-inch valves.

Also, for furnishing materials and erecting one metallic stand-pipe, 25 feet diameter and 100 feet high, including foundation for same.

Also, for pumping machinery, as follows: One compound or condensing engine of capacity to pump 2,000,000 gallons of water in 24 hours against 225 feet head, and one non-condensing engine of 1,000,000 gallons capacity under like conditions, including engine foundations.

Also, two return tubular boilers approximately 5 feet 5 inches diameter, 16 feet long, including foundations, settings and connections.

Also, one brick building, to be sub-divided into an engine-room about 40′ x 40′ and boiler-room of same dimensions, together with coal-room, tool-room and office-room, as per detailed drawings.

Also, one brick smoke-stack, 100 feet high.

Detailed drawings for above work can be seen at the Trustees' office from and after July 10, from and after which date also specifications, forms of contracts and proposals will be furnished by the Trustees.

The Trustees reserve the right to reject any or all bids.

WM. F. HAYNES,
C. F. REIFF,
F. FABING.
} Trustees of Fremont Water-Works.

242 J. D. COOK, Toledo, O., Consulting Engineer.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co. No. 342.

JULY 15, 1882.

Entered at the Post-Office at Boston as second-class matter.

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NOTWITHSTANDING the apparent energy of the New York Department of Buildings in searching out insecure structures accidents continue to occur which, as it would seem, might have been prevented by due care. The latest of these happened last week in the Bowery, where two failures took place in the same building within twenty-four hours. The edifice was a furniture warehouse and factory, four stories high, just behind which a cellar was being dug. The contractor for the excavation discovered that the walls of the factory had little or no foundation, and informed the owners that he could not continue his work without danger of bringing the building down. They seem to have taken no notice of the warning, and the excavation was finally resumed. Some attempt was made to prop up the structure, but the work, difficult at the best, seems to have been inefficiently performed, and the walls bulged until one evening, about six o'clock, a portion of the upper floor fell in, badly injuring a clerk who was the only person remaining there. The police promptly notified the Building Department, and an inspector was despatched to the scene, who concluded that it was too late for him to do anything about the matter, but promised that it would be "looked into" the next morning. The next morning, however, nothing had been done when the employés of the factory, mostly girls engaged in sewing carpets on the third floor, came as usual to their work. As there was no one to warn them or to take the initiative in refusing to encounter the danger which stared upon them from the ruins of the previous night's crash, the poor girls took their accustomed places with the unreasoning docility characteristic of their class, and began their daily toil. Hardly had they taken up their needles when the building began to sway, and the rear wall fell over with a crash into the new excavation behind it. Fortunately it drew the floor with it, until the beams lost their hold and dropped all at once to the story beneath, forming a slide, down which the occupants of the room were pitched in confusion to a place of safety, while their hats, shawls and other small property, which were put away in a back room adjoining the wall, were hurled into the cellar and buried in rubbish.

ON investigation, it proved, as it usually does in such cases, that no one was responsible for an accident which injured four innocent persons, and inflicted loss or pain on many more. About a month ago the building was visited by an inspector from the Building Bureau, and reported as unsafe, by reason of the excavations proceeding on the adjoining lot, and an order was issued to the owners and lessees to make it safe by shoring and underpinning the rear wall, and building a new foundation for it. The lessees, on receipt of this order, replied that their lease did not impose any such duty on them, and referred the department to the owners. A search was accordingly made for the latter, but it appeared that a transfer of the property had recently been made to some person unknown, and one of the lessees, being inquired of, professed to be unable to give any information on the subject. Mr. Woodruff, the contractor for the excavation on the adjoining lot, who seems to have been the only person to show any sense of duty or humanity, offered to take upon himself the responsibility of shoring up the building and putting a proper foundation under the wall, but the lessees refused to allow him to enter their premises. Meanwhile, as it appears, the lawyers of the actual owner and the lessees were engaged in disputing as to which was the proper party to make the repairs, and on the very day before the building fell one of the lessees, fearing that his business would suffer from the delay, agreed to undertake them. The moral which the Department of Buildings draws from the occurrence is that the public safety requires that it should be armed with power to enforce summarily its requirements. At present it can only act by giving notices, and if these are disregarded it must go through a long process before a court to compel compliance. During the interval defective walls may fall, or weak floors give way, sacrificing precious lives, which might have been saved if more effective action were possible on the part of those best fitted to take the necessary precautions against the danger.

IN accordance with the requirements of a recent State law of Massachusetts, special inspectors are now engaged in visiting the freight and passenger elevators used in Boston to see whether they are provided with proper appliances for preventing the fall of the platform in case of the breaking of a rope. During the first day's tour several safety-catches were practically tested, and although all of them fulfilled their duty of checking the fall of the weight on the disconnection of the rope, there was a wide difference in their operation. The first elevator tested was fitted with the Thayer safety-wedge, a well-known apparatus by which the car in falling drops between two wedges, which force themselves against the guide-posts and gradually bring its movement to a stop. On disconnecting the rope the platform fell sixteen and one-half inches before stopping entirely, but the checking of the motion was so smooth and gradual as to be hardly felt by those in the car. The next experiments were made upon a heavy freight elevator, provided with cam-catches, of a pattern which is not particularly described in the report of the Boston *Herald*, from which we obtain our information. The first test was made without any load on the platform, which when allowed to fall descended nine and one-half inches before it was checked. A weight of fifteen hundred pounds was then placed upon it, and with this addition the platform fell twenty-eight and one-quarter inches before it was arrested. The next two elevators were provided with Merrick and Baldwin's well-known safety-catch, which brought the platform to a stand in the space of about an inch. Another round of visits is to be made soon, and we hope that further experiments will be made upon some of the elevators already inspected. A safety-catch which allows the platform to which it is attached to fall twenty-eight inches before it acts should be rigorously tested, and with heavy loads. Under the law of accelerating velocity, the blow given to the guide-posts by a platform weighted with one or two tons of goods, when brought up by a safety-catch after two or three feet of fall, would be terrific, and there are many buildings where the slender hard-pine timbers used for this purpose would inevitably fail under such an impact, bringing down the whole structure in a heap. There is also another large class of elevators, depending for safety on the multiplication of the suspending ropes, which should be thoroughly tried. So many accidents have occurred where the platform was sustained by two, or even four ropes, as to furnish a strong presumption that on the parting of one, the shock of the sudden transfer of the weight to the others, multiplied perhaps by the impetus acquired through a small fall, is often sufficient to break them successively, and thus release the car entirely; and as platforms of this class are very commonly devoid of any sort of safety-catch, the car in this case inevitably descends to the cellar.

A NOVEL case in insurance law is reported in the *Fireman's Journal*. It seems that the owner of a certain building applied for insurance upon it, and received two policies, of twenty-five hundred dollars each. As it turned out, at or about the time of the delivery of the policies the property intended to be insured was actually on fire, and the question arose whether the insurance companies were liable for the loss. According to the authority quoted in the *Journal*, the decision must turn upon the precise time of the beginning of the fire, which a jury would have to determine according to the evidence. If the contract of insurance was consummated, or, as the lawyers say, "the

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minds of the parties had met," before the breaking out of the fire, the companies would be liable, even if the policies had not been delivered; but if at that moment the fire had actually begun, then there was no liability, for the reason that the subject-matter of the contract of insurance—the house—was no longer in the condition in which it was assumed to be, and which formed the basis of the contract, since no one would knowingly insure a burning building. On the other hand, the same authority remarks that if a policy of insurance should expire during the progress of a conflagration in the building covered by it, the company issuing the policy would be held for the whole loss, even though the fire might have just commenced at the hour which terminated the policy, and the main part of the destruction might have occurred subsequently.

The New York *Times*, in an editorial article referring to the new building for the Produce Exchange in that city, mentions that a process has been discovered for protecting iron from corrosion, which can be applied on a large scale, and is considered to be far superior to that practised under the Bower-Barff patents. The inventors are, it is said, about to make public exhibition of the results attained by them, and it is claimed that a cheap and effectual mode of accomplishing the long-desired end is at last within our reach. We wish we could feel full confidence that this promise would be realized, but hope for the best, and can quite agree with the *Times*, that if such a process should really come into extensive use a new field will be opened to the art of architecture. One of the worst obstacles to the use of iron as a means of decoration or expression in building has always been the necessity for bedaubing it with successive coats of paint, which destroy its apparent character as a metal, without assimilating it to any other class of substances. If this objection can be removed, and iron can be employed in such a way as to exhibit its shining surface and sharp lines, a wide range of novel and beautiful effects will be at the service of architects who know how to use them.

According to the *Fireman's Journal*, a singular entertainment is about to be opened to the public in Boston, which will represent with as much vividness as possible the incidents of the great fire in Chicago. The performance is to take place in a certain garden, used during the warm season for open-air concerts. A small lake in the garden is to separate the spectators from a group of structures, one of which is to represent the historic barn in which the conflagration began. A cow, to follow out the story, is to overturn a kerosene lamp in the straw, and the blaze so started will rage until the mimic city is consumed. To give animation to the scene about a hundred and fifty personages, as firemen and citizens, will be seen escaping from the burning buildings, rushing up with engines, and so on, and the local topography is to be reproduced as accurately as possible. By artifices known to theatrical machinists, the houses will be put together in such a way as to be capable of renewal night after night for an indefinite period, and we hope that the drama, or pantomime, or whatever it may be called, will have a long and successful run. The actual sight of an overturned lamp, with the blazing oil spreading through the inflammable straw, ought to produce an indelible impression on the minds of the spectators, and if it should serve to warn any of them against the careless habits in regard to fire, which are now so common, it will have served an excellent purpose.

The project for completing the Hennepin Canal, which is intended to connect the Mississippi with the navigable waters of the Atlantic slope, has, after engaging the attention of Congress and the country since the beginning of the session, been finally rejected, apparently on the ground of the uncertainty as to the outlay which might be necessary to complete it. The route was, we believe, surveyed some years ago by Government engineers, and an approximate estimate of its cost made, but values change rapidly in the West, and the question of land damages would probably be a much more serious one now than it was then. Judging, however, from the evidence which the friends of the scheme bring forward in its support, there is little doubt that it will ultimately be carried into execution. Of the other engineering projects which have been considered by the present Congress, the work upon the Mississippi seems to have been looked upon most favorably, and a large discretionary power has been given to the River Commission to carry out needed improvements, together with a liberal appropriation to pay for them. The interoceanic canals, the most important of all these enterprises, have been left to be discussed last, and the prospect is said to be that the Nicaragua canal scheme will receive the approval of the Government.

We have received a very amiable and sensible letter from Dr. Ephraim Cutter, of New York, who thinks that we did injustice to Dr. Salisbury in some remarks made not long ago upon his system of curing consumption of the lungs. That we may judge for ourselves of Dr. Salisbury's character as a man of science, he sends us a list of his published and unpublished works, which certainly proves him to have been one of the first and most original explorers in the field of microscopic pathology. Among the published papers we find one dated 1862, on "The Influence of the Fungi of Wheat and Rye Straw on the Human System, and some Observations which point to them as the Probable Source of Camp Measles, and perhaps of Measles generally;" and immediately after, with the same date, comes one on "Inoculating the Human System with Straw Fungi to protect against the Contagion of Measles, with Observations on the Influence of Fungoid Growths in producing Disease." In 1868 was published a treatise on "Microscopic Examinations of Blood, and the Vegetations found in Variola, Vaccine, and Typhoid Fever." In 1862 was prepared, but not published, a considerable work on "Microscopic Investigations connected with the Exudation and Expectoration of Angina and Scarlatina, resulting in the Discovery of the Source of the Exudations; and the further Discovery of a Fungus developing in the Sloughs and Membranes, the Spores of which are infectious and produce the Disease, also General Conclusions on the Etiology of Fevers, and the probable way in which the System receives Immunity by one Attack of certain Contagious Diseases against a second Invasion of the same." Twenty years ago this was certainly a novelty in the way of medical science, and we should be sorry to do anything to diminish the credit which such researches deserve.

In regard to the Salisbury mode of cure we are glad to express our gratitude to Dr. Cutter for a carefully corrected copy of a pamphlet describing at length a treatment which, even if it should be, as it seems to our uninstructed mind, very inadequate to its purpose, has nothing of charlatanism about it. In the opinion of the author, consumption comes from continued unhealthy alimentation, and must be cured by removing the cause. "This cause," he says, "is fermenting food and the products of this fermentation;" and if the simple directions contained in the book "are faithfully followed out and persisted in, consumption in all its stages becomes a curable disease." As the publication of the treatment makes it common property, there can be no harm in gratifying the curiosity of our readers by a brief description of it. Beginning at the first direction, half a pint of hot water is to be drunk an hour before each meal and on retiring, to wash out the stomach. Tea, coffee or beef tea may be drunk at meals, and hot water or beef tea in the intervals, if desired. For food, broiled beefsteak, without fat or bone, broiled chicken or game, oysters and fish, free from fat, are prescribed, with bread, toast, rice, cracked wheat or oatmeal, in the proportion of one part by bulk to from four to six parts of meat. Soups, vegetables, fruits, pies, cakes and sweets, pickles and preserves, fried edibles generally, and vinegar, are prohibited. Meals are to be taken at regular intervals, and the patient should eat either alone or with others using the same diet, and after the appetite increases, as it soon does, lunches of broiled beefsteak and tea, coffee, beef-tea or hot water, are permitted between the regular breakfast, dinner and supper. In the way of general regimen, two thorough baths with hot water and soap are to be taken every week, oiling the skin all over afterwards, and every night and morning the body is to be sponged with hot water, containing for the evening bath a few teaspoonfuls of ammonia. Flannel is to be worn next the skin, and the clothing frequently changed and aired. This, with as much open-air exercise as can be borne without fatigue, or thorough rubbing and pounding of the body morning and evening for those too weak to take exercise, constitute the substance of the treatment, but simple tonics of oil of peppermint, orange-peel, ginger, witch-hazel and other mild ingredients are to be administered before each meal, with small doses of pepsine afterwards, and hemorrhage is to be checked by inhaling the spray of a weak solution of persulphate of iron.

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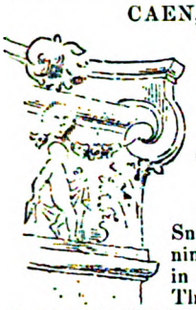
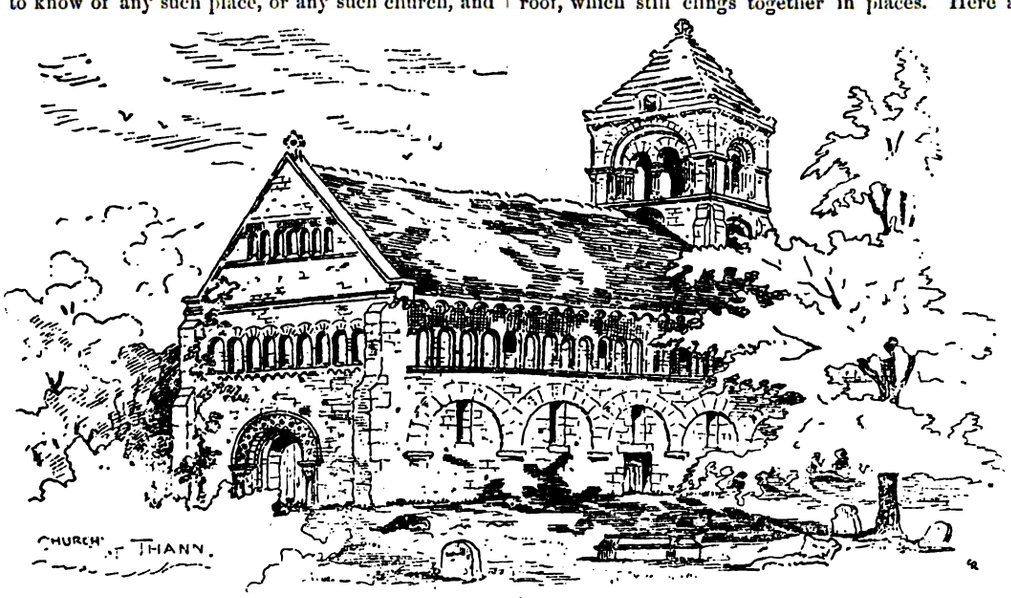
CAEN, AND A ROMANTIC TRIP.



IF there is anything more enjoyable to a lover of antiquity than a trip in search of an object that has only been seen in sketch form, or about which one has read with interest, we beg leave to ask what it is. That dreamy uncertainty, that sketchy beauty which almost makes one believe the thing only existed in the imagination is what every one loves to follow out and find if it be reality. Snugly ensconced in our easy-chair one winter evening in dressing-gown and slippers, map and book in hand, we read an account of the little church of Thann, which was bewitchingly set off by a sketch showing the little church in a ravine, surrounded by its quiet burial ground, over which the trees drooped in heavy festoons. The article and sketch were from the hand of Monsieur Petit, and jotting it down in our book of trips, we resolved to look it up at all hazards should the opportunity ever present itself.

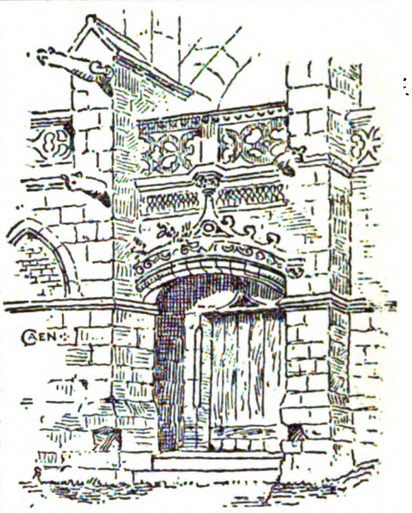
Six months after that evening, leaving Bayeux and on our way to Caen, near which we knew was this little object of interest, we determined to look it up. How to find out exactly where it lay was another question not so easy to determine. Our guide-books simply mentioned the fact of its existence, with the additional invigorating assurance that it was seven miles away, but no compass points given. No one seemed to know of any such place, or any such church, and as for any information to be obtained from this point, it might have been in the next street for aught the people would have known. This ignorance of their neighborhood was astounding; — they seemed to live in a little world of their own, and totally oblivious to any and all objects of interest near them. We had almost made up our minds to the old way of finding a lost article by throwing up a stick and blindly following the direction it pointed when it struck the ground, when our guide-book again came to the front by speaking of M. Caumont, a noted archæologist, who knew every stone in and around Caen. Surely, then, he was the man to find, and we started out in search of him by going to the private Caumont museum. Arrived at the door, a rosy-cheeked French girl opened the portal, and upon our inquiring for the monsieur, she threw up her hands and exclaimed, "*Mon Dieu!* he has been dead three years."



There are times in men's lives when business seems to be so pressing that it is next to impossible to stop and explain things, and this was one of those times. The first convenient corner was the object of our search just then as we hastened away. Next came an ancient specimen who must have been contemporaneous with the object of our search; but no, he didn't know of such a place as Thann, much less of its church. Then came the hotel clerks, always interested in our wants (for a franc), but they knew of no such church; indeed, we always believed their church acquaintance to be limited, at least from their methods of extortion. At last an old stage-driver "thought he knew of the church we were looking for," and agreed to take us to this rather indefinite somewhere for the very definite price of twenty francs.

All this illustrates the difficulty which one often encounters in trying to find little gems of art, which it would seem would be guarded with care, instead of being totally ignored and forgotten. Presently the *voiture* came rumbling along and turned out to be a close covered 'bus, which had evidently seen long service. No talk would avail to procure an open team: they had no other, so we mounted, and with Yankee-cheek stretched out on top, with our feet hanging over the roof, and started off in high good humor, while the little boys, old men and maidens, and an innumerable canine tribe watched us in picturesque garb and attitude, much as a California mining audience watched the prophet of old gold and olive green.

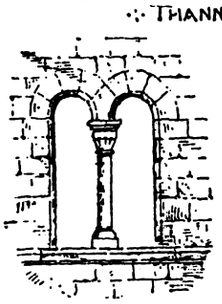
As one goes out through the city of Caen he passes perhaps a half-dozen ruined churches, reminders of other days. Many are very beautiful and finely proportioned, one or two with exceedingly picturesque towers, while all seem to have been given up to the ravages of time, or occupied by cavalry or as hay-lofts. One in particular looked so very attractive as a specimen of demolished picturesqueness that we stepped around to the entrance, and were confronted by an old acquaintance in the form of "a franc admission." This called for other persons altogether, and pretending not to understand the significance of the sign, we slid in while the antiquated porter was showing another party around, and by dint of shadowing the ancient columns managed to get a good look at the inside. Carvings, altars, saints, old seats, and inlaid floor form a grand chaos in the nave, while along the aisles are piled up huge theatre scenes, which are in strange contrast with the sombre old roof, which still clings together in places. Here and there in the clerestory are small bits of broken colored glass through which the sun streams and breaks across arch and column with fantastic form.



Another old church, St. Gilles, struck us as being of superb proportions, and a most enchanting old entrance on the west side found its way into our sketch-books: a richly-ornamented arch with balustrade above, set between two buttresses. The doorway, broken and battered, still shows its beauty; the door which once swung open to the devout worshipper is no more, but in its place rough boards are nailed up, which testify to the inquisitive small boy with the jack-knife.

Thus we might go on with a half-dozen more such scenes, but meanwhile we have left the city and are crossing the fields, passing innumerable peasants who turn to gaze in astonishment at us in our elevated position. Away over on the left, standing alone in the fields, are the ruins of the Abbaye d'Ardenne, a Gothic church and abbey with a huge gate-tower remaining. Partly covered with some creeping vine it looks exceedingly beautiful, yet very lonely. Away from the habitation of man, the excitement of the city, and the whirl of business, — these were the places the monks chose for their retreats, and a true history of which could no doubt reveal many romantic episodes, but into which we may not delve, although our thoughts keep pace with the slow movements of our horse.

THANN



Soon we come to a hamlet composed of little stone houses and clay huts, with high stone-walls in front, often showing huge flat arches with their peculiar locked voussoirs. A postman rides up and deposits a letter in a little stone letter-box on the wall, and passes on; everything is quiet, and only here and there a face appears at the window or door. Thus a couple of hours pass, and the top of our 'bus is getting exceedingly hard; the old driver has told us all he knows and probably a good deal more, but at last drives up to a little side lane not large enough for a carriage to pass, and leading directly down into the woods: here he stops, and tells us that if we walk down there about a quarter of a mile he thinks we will find the object of our search. Just such a place as imagination had pictured from the little sketch of M. Petit, and so we start ahead, leaving

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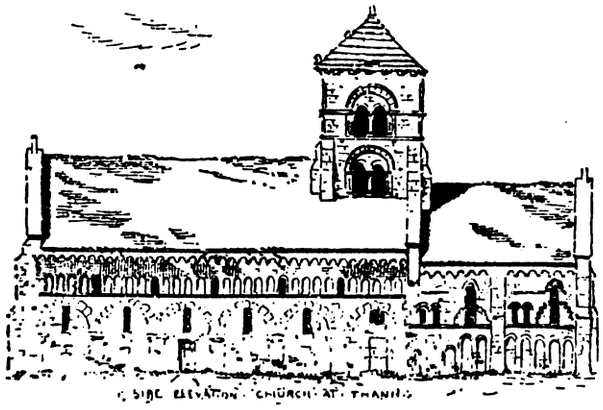
our old Frenchman to look after the team, under the exhilarating influences of a bunch of cigarettes and a bottle of wine. Down we go into the woods, not a dwelling in sight, and nothing to disturb the stillness of nature save the birds and a ghastly joke now and



SIDE ELEVATION · CHURCH AT THANN

then by ourselves. Peering here and there through the trees, wondering if we are not on a fool's errand, suddenly on our left, almost hidden by trees, sure enough there lies the little church, surrounded by bog land, and almost impossible to get at by reason of the wet.

I cannot express the beauty of that little view, and our sketches but faintly show it. What a history it could tell if it might but speak for itself. Built away back somewhere before the eleventh century, it certainly must have been near a little village, of which now no vestige remains save in the little churchyard which surrounds it, where no doubt are the remains of its devout worshippers.

My chum with his usual sacrilegious curiosity, suggests the idea of a forced *open sesame*.

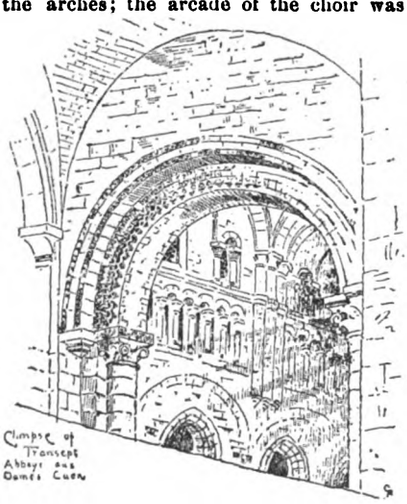
"Horrible!" say I, at once climbing up a tree to look in at the barred window.

"It wouldn't be just the thing, I know," says he, pulling off a board. "No, that's so," I answer, tugging away at the iron bar in the window.

Somehow or other the spirit of old Father Adam together with a good deal of brute force overcame any trifling obstacles, and after looking around to see if any one was watching, the iron bar was persuaded to give way to antiquarian research. Useless precaution this: the only human being within miles, so far as we knew, was our old driver. My chum not claiming any great degree of rotundity was pushed in first, and I followed, being pulled through by him. What a mite of a church, certainly.

There was the altar in the chancel thrown down and broken, the carving defaced; there was the little font complete, while the dog-tooth carving around the arches was almost as sharp as of old, and the heavy twelfth-century capitals with their well-known carving nearly all intact.

The aisles had long since disappeared, and been built in between the arches; the arcade of the choir was broken, yet showed its whole contour; only a vestige of the roof remained, of wood, upon which, it seemed, color still showed, whether old or new we could not tell; up through the central tower opening appeared the offset of the staircase turret, on one side of the main tower, and the huge arches supporting the tower stood without a crack.



Outside, however, was the most attractive, so we pushed and pulled each other out again, dropped down from the window, and set to work sketching the exterior with its grotesque corbelled cornice, mosaic spandrels, beautifully proportioned tower, and solid stone spire. Thus passed a couple of hours, after which we walked back, found our old driver napping by the roadside, and after bringing him to life returned to the city.

It is not my intention to describe the city of Caen itself, but a couple of days can well be spent there. Near the centre of the town stands the Church St. Pierre, with its graceful Gothic towers, which vie in elegance with any in Normandy, having tall lancet windows, with finely-reeded mouldings. We enter and approach the ornamented choir, then pass into the surrounding chapels where the ceiling resembles a honeycomb of pendant fringes, exquisitely beautiful. In the nave are seen the grotesque capitals which puzzle and cause us to wonder why they were ever placed there. What there is especially religious in a fellow mortal with caudal extremity, would certainly puzzle all but Darwin; a knight of old crossing the sea on the edge of his sword is simply harrowing; and Aristotle bridled, and ridden by the mistress of Alexander, although a piece of historical romance, is not especially edifying, sanctifying, or purifying; but so it is in scores of churches, and even worse than this.

Above, on the hill, stands the monument which testifies to the desire of William the Conqueror and his queen to appease the Pope for their matrimonial proclivities, which caused them to contract a marriage contrary to the decrees of the church.

The Abbaye aux Hommes and Abbaye aux Dames are noted churches; let us step into the former, which, with its extremely plain and heavy façade, two west towers, central octagonal tower, and four east towers, forms a striking picture. The interior is severe in the extreme, yet has a certain grandeur of proportion which is very noticeable. A gallery composed of two tiers of arches forms the aisles, and the choir ending in an apse is surrounded by chapels in pointed Gothic. In front of the altar is a flat slab, the tomb of the Conqueror, and here the old warrior hoped to rest after the conflicts of this life. Poor old man! although once a conqueror here, the Huguenots, in 1562, with fiendish hatred violated his resting-place, and scattered his ashes to the winds.[1]

Cross the town now and enter the Abbaye aux Dames, with a totally different and lighter interior, containing much of the grotesque element in carving, some of which would certainly cause Matilda to shake in her grave could she but see it. A most beautiful view was afforded us as we walked up the left aisle, and looked over a high screen into the transept, now used as a hospital for the sick. The light streamed through the colored windows, scattering its rays on the walls, breaking around the columns, and filling the arches with a flood of mellow light.

Behind the choir of the nuns is the grave of the queen, but this has fared the same fate as her lord's, being broken into and despoiled by the Calvinists. "Uneasy lies the head that wears a crown," was true then as now, and forms a strange comment on the religious zeal of those times.

On the outskirts of the town stands the beautiful tower of St. Michel, and while endeavoring to get a good view of it for a sketch we saw a group of nuns approaching, with rosy cheeks framed into their black bonnets, and looking certainly as worldly-minded as the rest of us; but they passed on and went into a little school-yard near by, with a high you-can't-look-in-here sort of a fence, while

[1] The history of the time of William the Conqueror is one of extreme interest, and sadly interesting when we read of his death and burial. Tortured by the injury he had received at the cruel sack and burning of Mantes, he repaired to the nunnery of St. Gervais to die. Deserted by his own sons when the breath was scarcely out of his body, forsaken by friends and courtiers, and plundered by his servants, his body remained stripped and uncared for until an unknown knight in the neighborhood provided the funds necessary for the funeral and

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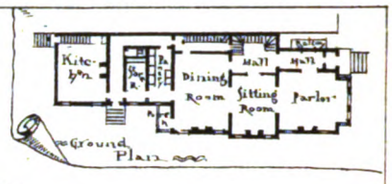
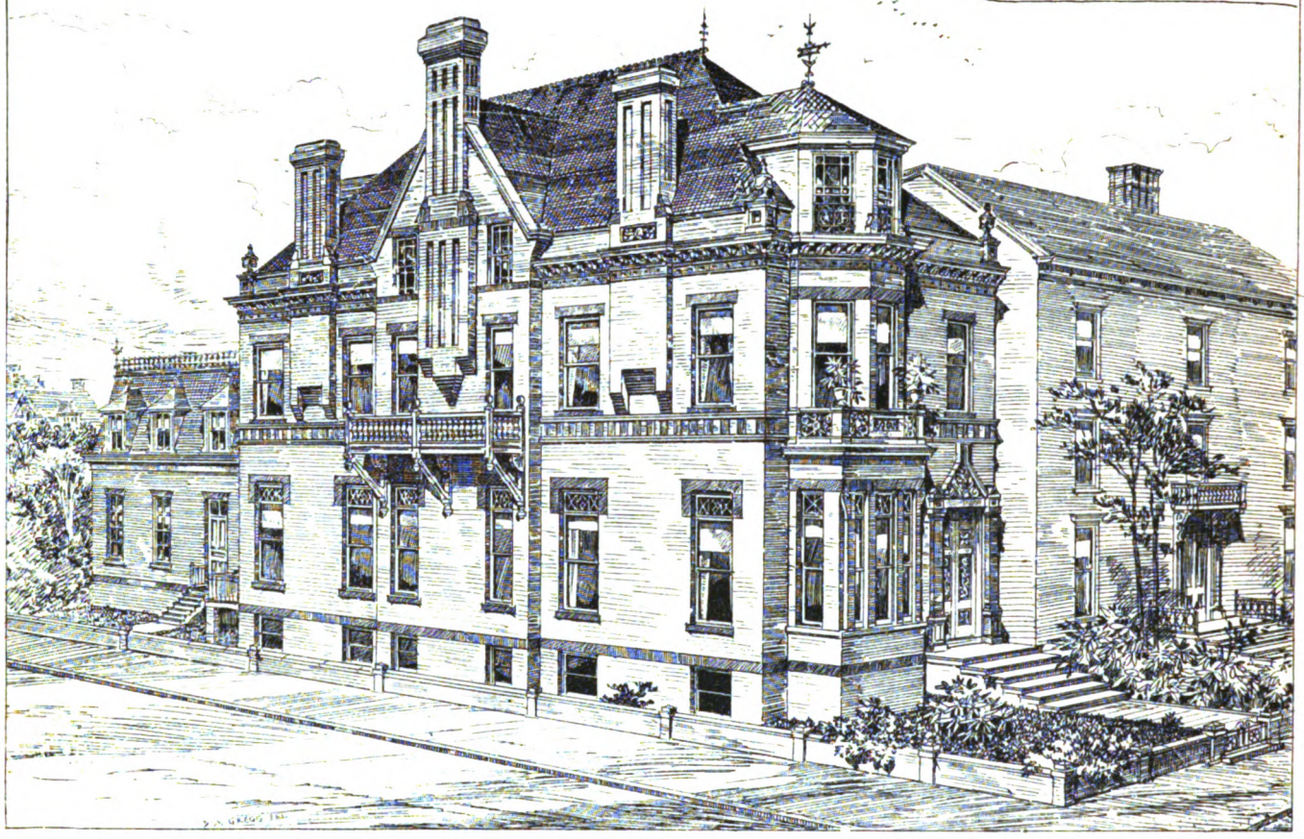
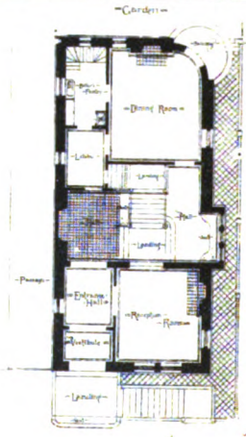
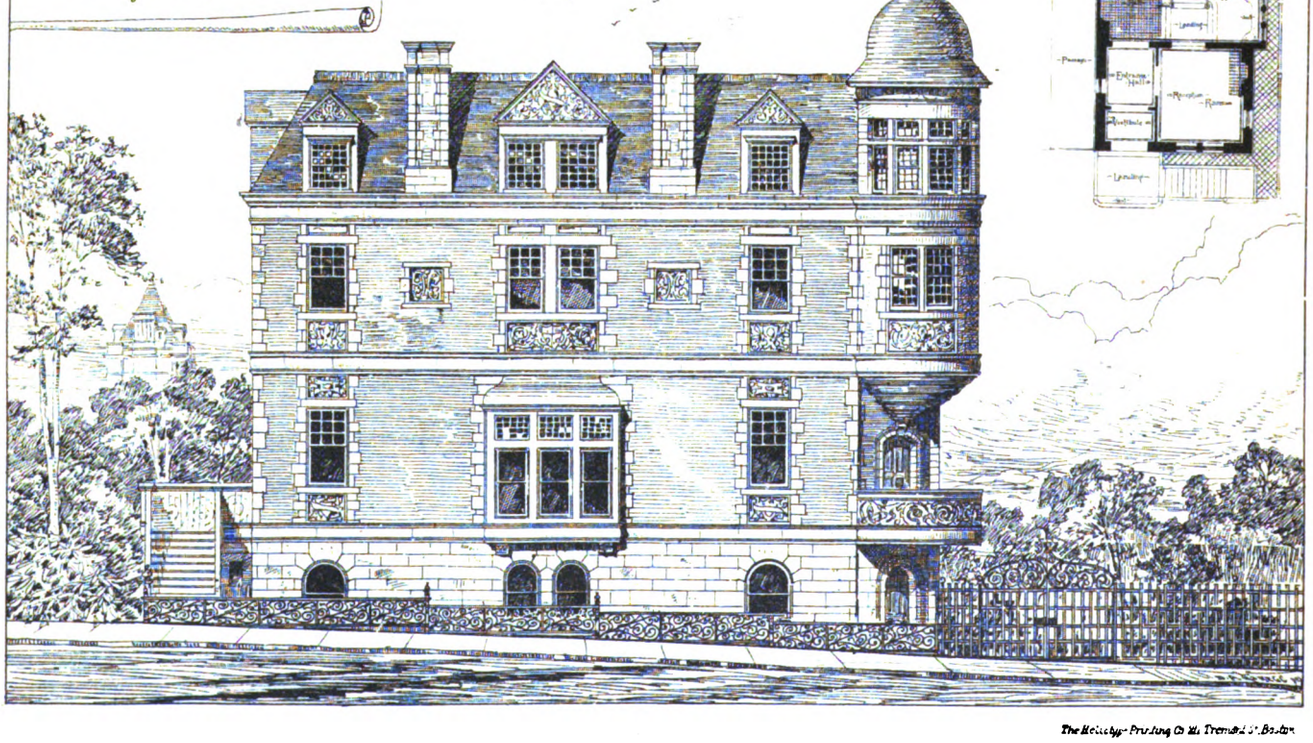
Proposed Residence Cor. Franklin and 5th Streets
Richmond Va.
M. J. Dimmock, Archt. Richmond.





Proposed Dwelling
at
Taylors Falls Minn.
for
Samuel McSpedon Esq.
Jno. Wolf N.Y.





The Heliotype Printing Co. 22 Tremont St. Boston.

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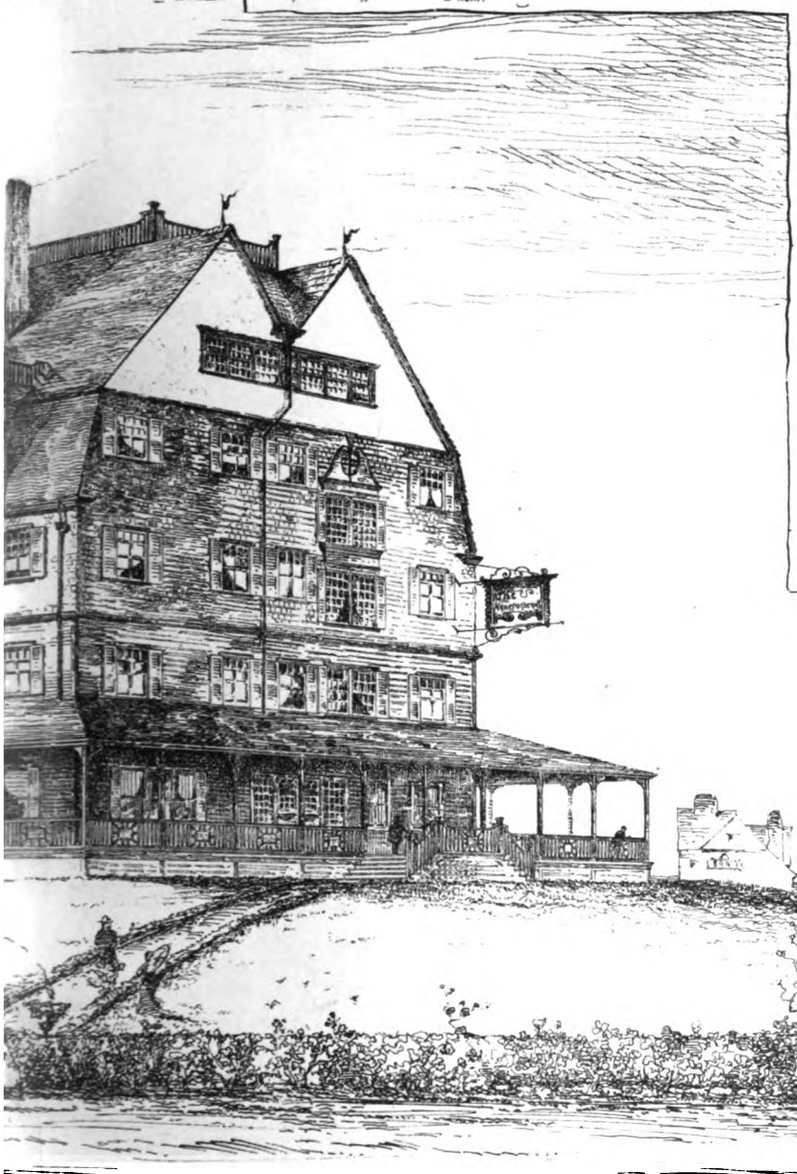
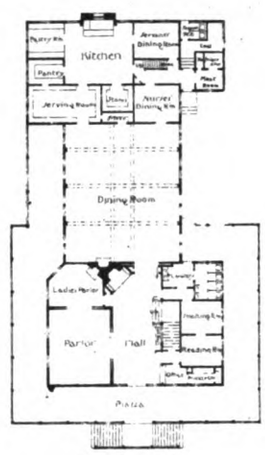
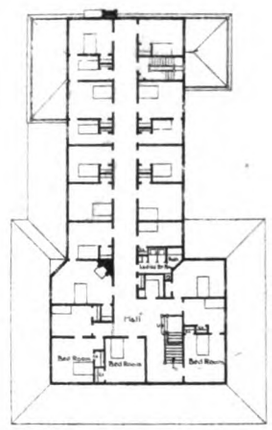




First Floor Plan



Second Floor Plan

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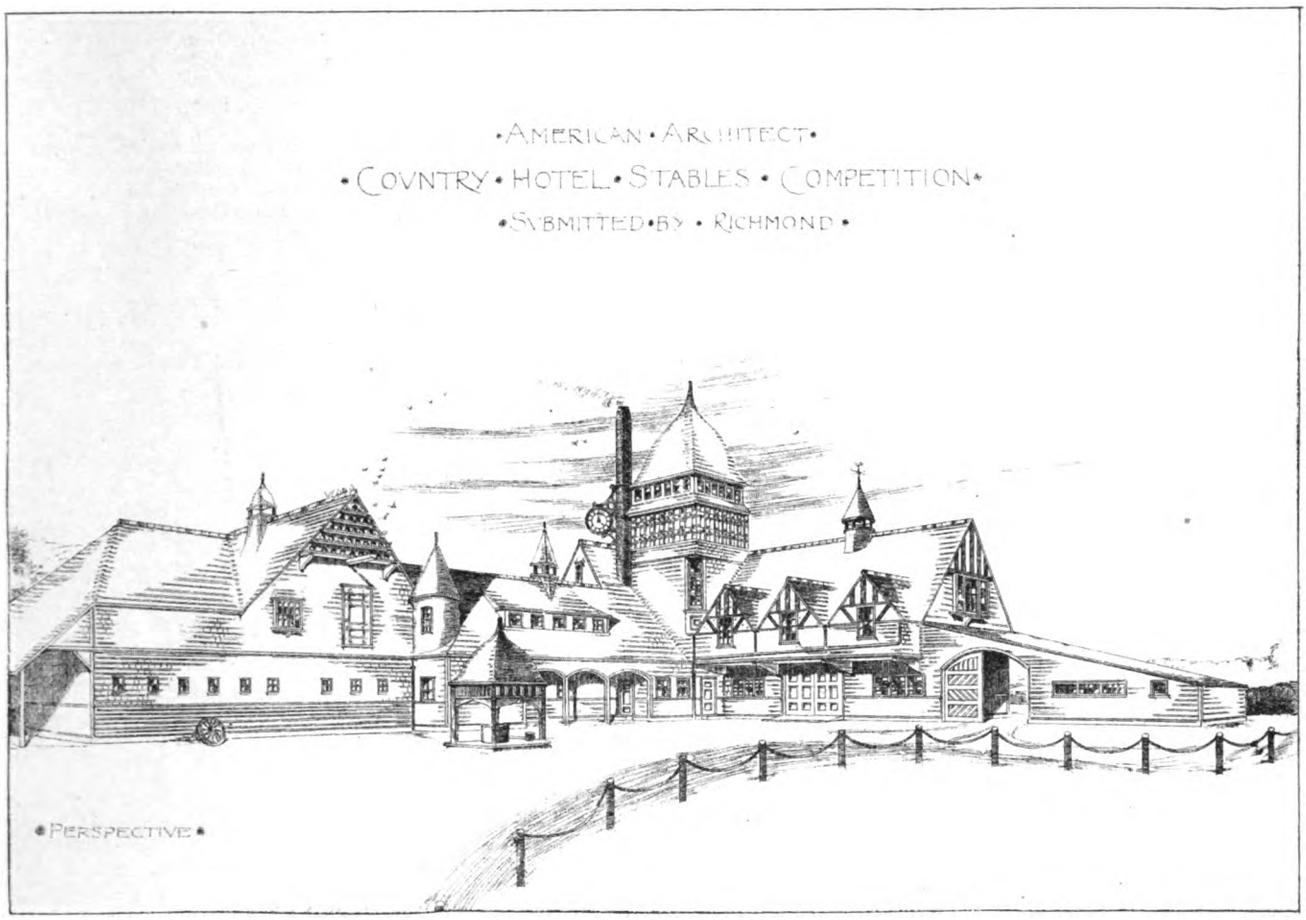

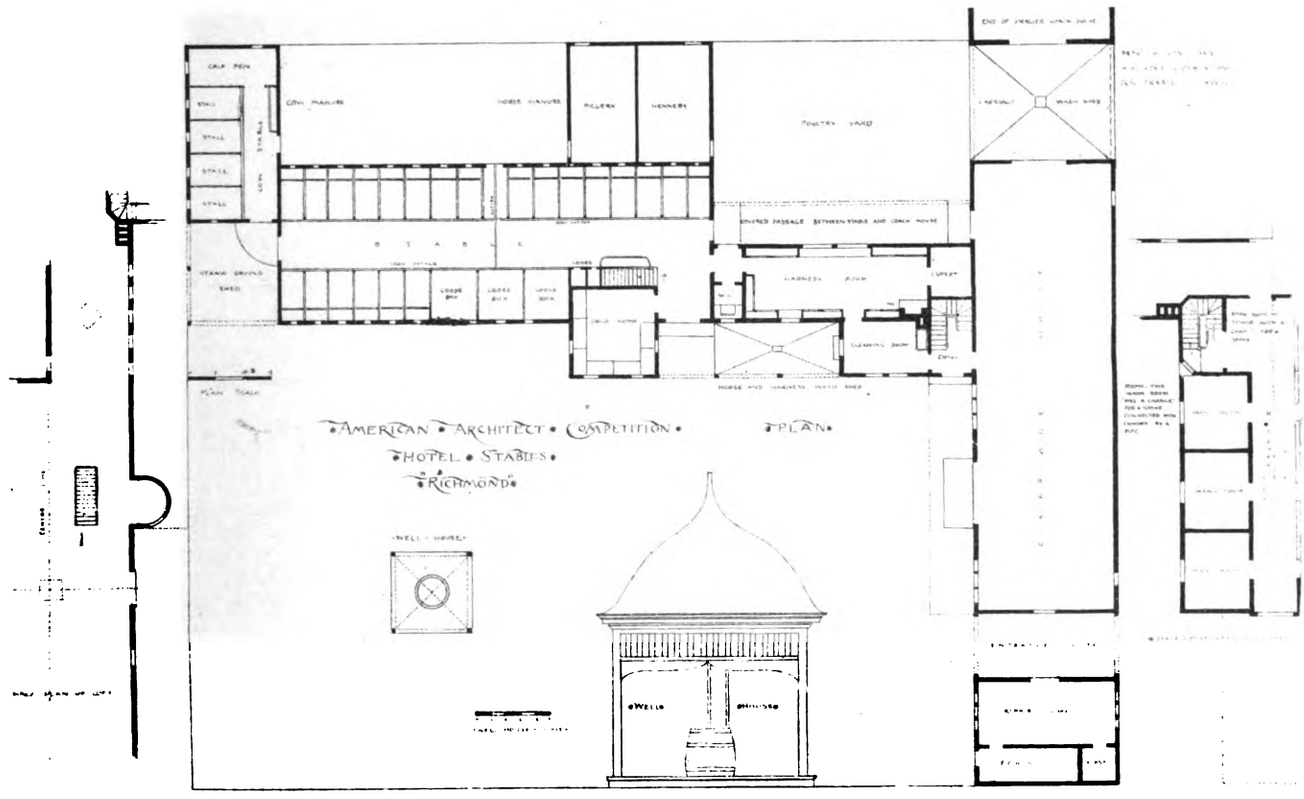

The Heliotype Printing Co. 211 Franklin St. Boston.

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I restrained my chum from making any outward expression of interest. Curiosity, however, prevailed, and seeing that the yard was almost the only place where a good view could be obtained, we boldly entered, and stole our sketch, while they watched us closely to see that we didn't carry off any of the sacred yard dirt.

The picturesque houses of Caen are fast disappearing, but as we came down the street to the hotel, we hurriedly sketched one with boldly-projecting front stories, filled in with plaster and very low-studded; but this one suffices for any one interested until they stand upon the ground themselves, and enjoy its antiquity, as we did. But simply remember when you are in Caen don't neglect to look up the beautiful little church of Thann.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR A COUNTRY-HOTEL STABLE. BY "*Richmond.*"

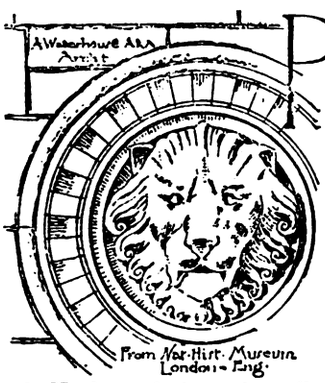
"*Richmond*" has grouped his buildings about his court-yard, with so evident a determination to make a picturesque composition at any cost, that we are not surprised to find that this noble pile — albeit rather forced in effect — rises from a plan which seems to have received little consideration as far as its general disposition is concerned. The details of the arrangements show no lack of study or skill; but there was an evident lack of preliminary studies to determine the most convenient *parti* or scheme, and therefore all the ingenuity of the author has failed to bring his chief services into proper relation to each other. The sharp turn from the entrance gate to find shelter is awkward for the arrivals, and the covered entrance would have gained in value, as would also the coach-house, had there been a large instead of a small door between them. The communication between the stable and the coach-house is not well managed. When the latter should be filled with vehicles it would be awkward to lead the horses to be attached to vehicles at the end farthest from the exit into the court. The ventilation of six of the horse-stalls into the piggery and hennery is a curious freak, when the size of the poultry-yard adjoining is considered. The water-closet is badly placed at the end of the harness-room. With elevations of such pretensions it was unfortunate to relegate the main gateway to an humble corner of a shed. "*Richmond*" has too much cleverness to justify these defects in his design.

PROPOSED HOUSE FOR S. MCSPEDON, ESQ., TAYLOR'S FALLS, MINN. DESIGNED BY MR. JOHN WOLF, NEW YORK, N. Y.

"THE NANEPASHEMET," MARBLEHEAD NECK, MASS. MESSRS. H. P. CLARK AND I. LEWIS, ARCHITECTS, BOSTON, MASS.

HOUSE AT THE CORNER OF FRANKLIN AND FIFTH STREETS, RICHMOND, VA. MR. M. J. DIMMOCK, ARCHITECT, RICHMOND, VA.

NOTES ON HOUSE-DRAINAGE.[1] — I.



PROFESSOR Kerr said, in a recent lecture before the Society of Engineers on "Foul Air in London Houses:" "The popular idea of drainage is very simple: you empty the slops into the sink, and they go, — the devil knows where." Popular ideas on the subject have advanced farther in this country. The public here seems to have formulated its convictions somewhat as follows:

1. A house on high ground with a good fall away from it ought to be all right as to its drainage, but, —

2. No house-drainage is really good which has not the approval of the family plumber.

3. There ought to be an open pipe on the roof of the house, or a connection with the chimney.

4. Unlimited expenditure on the plumbing works insures the safety of the house.

5. The public sewer is the root of all evil, and whatever else is neglected, the clean and innocent drains of the house must be securely trapped off from it, — or "disconnected."

6. The master-key of safety in the drainage of a city house lies in the ventilation of the public sewer, — about which we have much theory and little practice.

This advance in the popular idea, as will appear later, is not very great. It still remains true as a general rule that "the devil knows" a good deal more than the people do what becomes of the wastes of a house and of the products of their decomposition. Indeed it seems at times doubtful whether the people or the devil have the greater interest in the question.

There is one fundamental principle which an average member of a civilized community ought to be able to comprehend, and the universal comprehension of which is of great importance.

The unceasing production of organic refuse of various kinds is an unavoidable accompaniment of all human life, and it increases with increasing comfort and luxury in the manner of living. This refuse once cast off, its tendency to mischief begins. *Its complete and undelayed removal should be the one great aim of all efforts to deal with it.* The world, after ages of indifference, has for generations made blundering attempts to solve the problem by concealing its factors from sight. During the past few decades, as specific knowledge has increased, and as science has demonstrated the relation between filth as the visible or invisible cause and disease as the obvious effect, efforts toward removal became more earnest; appliances became more efficient; errors were discovered through experience, and, little by little, we groped along until, hardly ten years ago, there began to appear a marked improvement in the art of sanitary drainage, which was quick to take to itself the title "Sanitary Science." Enthusiasm and cupidity, a zealous philanthropy and a shrewd business instinct have all been busy in extending the domain of the new-found science. As the world is by nature impatient of a confession of partial knowledge, and as it is the general tendency of zealots no less than of manufacturers and dealers to jump at ultimate conclusions from incomplete premises, some began at the outset to claim for our new devices and improved methods a complete and final infallibility. Each succeeding year has developed new defects, until those who now attempt to instruct the public in sanitary matters speak with a chastened and modulated voice which is in strong contrast to their earlier positive assertions. We see now that the evils which have perplexed the world since the world began to grapple with them are much greater than we thought, and more elusive of our remedial measures. We are only now beginning fairly to realize the magnitude of the problem which is afforded by the apparently simple duty of disposing safely and completely of the residuum of the vast amount of food and fuel and material which we import into our towns and bring into our houses. We have much yet to learn concerning the exact relations between accumulations of waste matters and the health of the people.

With regard to the serious question of street cleaning and of the removal of dust and garbage, we are still quite at sea. With reference to house-drainage the advance has been much more satisfactory, and from the present point of view it does seem possible to approach something near perfection, — though the ultimate disposal of our foul drainage is still by no means solved.

It is proposed in these short papers to treat only of the removal of what is included under the generic term "House-Drainage."

The make-shifts of the art which have appeared under the various forms of the dry-earth closet, the ash closet, Goux's tubs, the English tub-closet, etc., have all had and some still have their valuable uses, but they are none the less make-shifts. The best of these is the dry-earth closet or the ash closet, which are not infrequently, in the case of small buildings with little ground about them, the most available devices. They entail the serious inconvenience of the need for constant intelligent attention, and they have the grave limitation that they make no provision for the disposal of the large amount of liquid waste which even the smallest house produces. Their recommendation for general use has been based on two misapprehensions: one, that fœcal matter and urine alone need special preventive treatment, the other that the interests of the community demand that the manurial matters contained in fœcal and renal deposits should be preserved for agricultural use.

The first misapprehension is based on fact only in so far as the specific communicative principle of certain diseases is discharged with the evacuations. So far as these substances themselves are concerned, they are composed of the same materials that are contained in the wastes of the kitchen, and the gases resulting from their decomposition are essentially alike. It is impossible to detect by appearance, by odor, or by chemical examination any material difference between the contents of a cesspool filled with the decomposed discharges of a water-closet, and another filled with the decomposed discharges of a kitchen sink; both are alike effective in favoring the multiplication and diffusion of the germs of disease when impregnated therewith. Both are absolutely unfit to be retained within the limits of a town, or in the vicinity of a dwelling-house in the country.

The second misapprehension has been mainly dispelled by the discovery that the decomposition of organic matter in porous material — as in the accumulations of an earth-closet — is rapid and almost absolute. Earth used in the closet ten times over gains thereby very little manurial value. There seem to be but two ways to turn human wastes to account in agriculture: one is to store them in vaults and cesspools until they are needed; the other to deliver them immediately to irrigation fields as fast as they are produced. The latter method is commendable, and the former totally and universally condemnable, as implying storage, during decomposition, in dangerous proximity to habitations.

himself escorted the body to its last resting-place at Caen. The funeral was singularly interrupted even within the precincts of the church, and before the service for the dead was concluded, by a cry from one of the bystanders, a man named Asselin, who claimed the site of the grave, saying it occupied the place of his father's house, that he had been illegally ejected from it, in order to build the church, and he demanded the restitution of his property. This claim, thus boldly made, in the presence of the dead monarch's son Henry, being backed by the assent of the townspeople, who stood by, was not to be denied or rejected, and the bishop was obliged to pay on the spot sixty sous for the place of sepulture for the royal corpse. Even then, it is related, that as the coffin was being lowered into the grave it struck against some obstacle, fell, and was broken into pieces, so that the corpse, ejected from its tenement, diffused so horrible a stench through the church that the rites were hurried to a close and the assembled priests and laity quickly dispersed.

[1] By George E. Waring, Jr., Newport, R. I.

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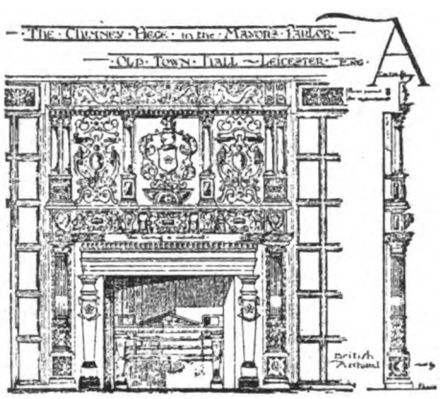
Cesspools and privy-vaults offer a menace to health compared with which no economical consideration is worthy of a moment's thought. Therefore, while these make-shift methods will be considered in connection with the drainage of isolated houses, they can have no place in the treatment of that part of the subject which is of more vital interest to the general public and which relates to the only complete system of domestic sanitation thus far devised: — the removal by water of everything that is capable of easy transportation in a running stream. Such removal is not only possible but is entirely suitable under all conditions where a proper means for the ultimate disposal of the liquid can be provided, even where there is no public water-supply, and even where only such water is used in the house as is brought into it in buckets.

ARCHITECTS' SUPERINTENDENCE.



A CASE of considerable importance to architects and employers came before the Nottingham County Court recently, and is reported in the *Building News*. The simple facts of the case were these: an architect of the above town sued a local physician for the balance of an account, owing for professional services. The defendant instructed the plaintiff to prepare plans for a house in the "Æsthetic style." A tender was accepted, and the plaintiff informed the defendant that it was necessary to appoint a clerk of works, as it was not expected that an architect could visit the building more than twice or three times a week, and it was the duty of the clerk of works to superintend the minor details. The defendant, however, thought a clerk of works unnecessary. The building was finished, and the plaintiff sent in his account; but the defendant paid only a portion of it, as he contended there were certain details not properly carried out, that the drains were defective, and the house consequently unhealthy. It was contended at the trial that these were details which could not properly come under the architect's notice; but that would have been obviated by the employment of a clerk of works. His honor took this side of the matter, and ultimately a verdict for the plaintiff was given for £25 and costs. The case has more than one point of interest for the architect and the employer: there is a certain amount of supervision expected from the architect, under the ordinary and customary usage of the profession. What does this consist in, and how many visits ought an architect to make a week to a building which he has undertaken to superintend? It so happens there is no written or traditional rule of the profession which defines such attention, and that in point of fact architects have to consult their own time and convenience in superintendence of works under their charge. It is a hard thing to say how much attention an architect ought to give to a work. The answer would necessarily depend on various considerations: the kind of contractor employed, his character for honesty and integrity, the class of building, whether it required more than usual care in details, the size and cost of the building, etc. It would be simply impossible to lay down a hard-and-fast rule: each case must be judged on its merits. Of course, it is no excuse for an architect to plead a large practice, and that, in consequence, he could not make so many visits to a certain building; the cost of the building ought not also to have anything to do with the superintendence, for if an architect, in however extensive a practice, takes a work, he is expected to carry out his engagement as much as any less busy practitioner. And men of large practices can well afford to leave small works to small men. An employer at least expects to receive from his architect such a fair amount of supervision as will guarantee to him that the work has been carried out in accordance with the design and intention of the specification; and yet it is possible to conceive such an amount of supervision inadequate to detect errors in workmanship or scamped work, such as bad drainage details. For example: no ordinary amount of supervision on the part of the architect can obviate such a blunder as giving a drain a deficient fall, of making a clumsy or imperfect junction with the sewer, of seeing that every pipe is sound and well jointed, or that the joints and workmanship of the interior sanitary arrangements are perfect in every detail. These are things likely to be neglected directly after the architect's back is turned. Nor, for the same reason, could an architect be charged for negligence in not detecting every bad brick or piece of timber introduced. It would be clearly out of reason to expect him to be always present on the works and watch everything done or every material brought into the building: so that the superintendence of an architect can only be reasonably understood to mean a general inspection of the works, and this is the opinion the judge of the Nottingham County Court formed upon the evidence adduced. Referring to the details, he said "these were clearly the duties of a clerk of the works, and if the defendant did not choose to engage one, he must abide by the consequence, for an architect could not be expected to be present to superintend these details."

The law affecting building contracts is not very explicit with regard to the question of the architect's duties in this respect. The law imposes on an architect, that he should be duly qualified to practise his profession, and that he should use a reasonable amount of care and skill in its practice. In ordinary contracts there is nothing said about what an architect's superintendence means. No case appears to have been decided, which defines the limits of the architect's authority in the general superintendence of works, and in the absence of such terms the duty has to be implied, and the law, indeed, dictates what any prudent man would consider fair. When an architect undertakes to superintend the erection of a building, he is supposed to exercise a reasonable amount of skill and attention, and the law would imply neither more nor less. The case we have quoted, so far defines the limit of the architect's duties, in respect of general superintendence, and, in the absence of an express agreement, the evidence of usage only is admissible. It is to be regretted that we have no decisions or legal authority which define the architect's duties with regard to superintendence, for there is ample evidence in the architect's practice to prove that much of the success of a contract work depends upon the attention given to details. Yet the case decided the other day shows what the legal mind would understand as reasonable in similar cases, and to this extent it will be useful as an authority.

Our readers may ask what is implied by reasonable superintendence. It is quite certain, as we have said, that an architect can only be required to exercise a general supervision over the works. The setting out of the building correctly, the construction of the walls and floors, and roofs, so far at least as they relate to their proper thickness, materials, and strength to resist pressure or weight, are all matters which strictly come within the architect's duty to see properly executed, as these are all matters for which his skill as an architect has been retained. They are matters also which depend upon the proper carrying out of the drawings and specifications, for it is very evident if a wall blew or fell down, or a floor gave way, it would imply a want of due skill in proportioning the thickness of the wall or the beams of the floor; and as these things are shown in drawings the architect is reasonably expected to see that they are carried out. But it may be fairly surmised that he cannot be held responsible for the introduction of inferior materials, or even for the bad workmanship of any part of a building over which he can only give a general supervision. If a wall gives way or a floor breaks down from bad material introduced in the substance of it, or from an imperfect connection or detail, which could not reasonably have been inferred from the specification and intention of the architect, he is clearly not liable, but the builder is the responsible party. Of course, we are supposing no case of negligence on the part of the architect to be proved. By the French code both the architect and the builder are liable during ten years for negligent construction, and a similar code we believe is in force in Lower Canada. With regard to drains, they are generally left to circumstances, and the architect rarely does more than indicate their position on the plan. The levels, joints, and junctions, are points which, however important to be attended to, cannot fairly be said to come within the architect's general superintendence, as usually implied in building contracts. The law, in fact, holds the architect responsible for all relating to design and construction, but cannot require him to exercise the same care as regards workmanship, as it would be unreasonable to suppose he could always be on the works. The question, indeed, is of such vital importance to architects, that it naturally brings to the front another of considerable moment — namely, the employment of a clerk of works. It seems to us that architects whose practice is extensive should require in all cases the employment of clerks of works. In country practice of a moderate kind it is usual to do without their services, yet the saving is dearly purchased, and the demands made on the architect become more onerous. It is to the interest of the architect that a clerk of works be employed, and it is certainly to the interest of the employer. In no building is it possible to see that all the materials and labor are of the nature described in the specification and shown in the drawings, without one; and we think it the duty of the profession to lay down some rule by which they may place themselves in a position of independence. When ought the clerk of works to be employed, and on what kind of work? are questions that might very well be left to an architect's discretion. In the case we have mentioned the plaintiff informed his employer that a clerk of works must be engaged, as an architect could not be expected to visit a building more than twice or three times a week. The defendant refused to have one, and the result was that the drains were defective. The judge observed with much truth that a clerk of works could not be considered merely as an ornamental appendage, for, as a matter of fact, the duties he was expected to perform were of a very important character. If architects desire to maintain their position as general supervisors of buildings, the sooner they come to a decision on these questions the better, and the employment of an efficient clerk of works ought to be considered almost as necessary a condition of good building as the employment of an architect.

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STRENGTH OF PORTLAND CEMENT-MORTARS.

NEW YORK, July 10, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — It would afford me pleasure to leave to Mr. F. E. Kidder, C. E., the last word in the interesting question on Bastard Mortars. Still as he wishes to learn which brand of Portland cement had been taken, in 1878, by Mr. Kuhn for his tests — and finally for the construction of the Albert Bridge in Dresden — I may be excused for informing him and you that "Star" ("Stern") Portland cement was used from the "Star" Portland Cement Works of Messrs. Toepffer, Grawitz & Co., Stettin, Germany, and that the preference was awarded to this brand on account of its superior fineness, strength and well-known uniformity, and after a series of tests made by Mr. Kuhn, with ten German and English Portland cements, to ascertain the strongest, most reliable and economical. The official report of the Board of the Albert Bridge Works, published by the "*Zeitschrift des Architecten und Ingenieur Vereins*" in Hannover, 1878, Vol. 24, No. 4, runs as follows:

"In comparing the results of tests, and the cost of ten Portland cements the Stettin 'Star' brand proved to be the best and most economical in all stages of mixture and induration. Although prices varied from 12 to 15 marks per barrel, and that of the 'Star' brand was M 14.50 delivered at works, all mortars made of 'Star' Portland cement were the cheapest. The ratio of strength of the different cements was from 1:4.5, the latter allowing of the largest addition of sand, and the formula of cost of the different mortars was as follows: — $1 \times 14.5 : 4.5 \times 12 = 1 : 3.7$."

If Mr. Kidder would read Mr. Henry Reid's book, "A Practical Treatise on Natural and Artificial Concrete, and its Varieties and Constructive Adaptations" (E. & F. N. Spon, 46 Charing Cross, London, and 446 Broome Street, New York), "Chapter XII," "German Portland Cement," he can gather the most reliable information on the merits of the German "Star" brand, if compared with what the above named most prominent English author on the subject considers to be the best of English Portland cements. Mr. Reid shares the opinion of those experts who have known this high-class brand of Portland cement since 1860. I am, dear sirs,

Yours respectfully, GUSTAV GRAWITZ.

THE ADVANTAGES OF FOREIGN TRAVEL.

PHILADELPHIA, June 27, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Is travel in Europe a necessary part of an architect's or designer's education?

Is it likely to prove a great benefit to him, or will it not tend to cramp his originality, and, would it not be better for him if he stayed at home, endeavored to understand construction, and studied the principles of beauty in nature? Would he not become a really better designer by doing so?

Hoping I shall not intrude too much on your time, I remain

Very respectfully yours, A. T.

[THE notion that the art of architecture can be learned by "studying the principles of beauty in nature" is one which we probably owe to a misinterpretation of some of Mr. Ruskin's expressions; but whatever may be its origin, it is a very widespread one, particularly among young architects of the more thoughtful class, who are charmed with the economy and facility which such a mode of instruction presents, as well as fascinated by the romantic freedom which it seems to promise to their aspiring imaginations. Nevertheless, there is no stronger proof of the feeble appreciation of architecture among us than the currency of this very idea. Is there any other art in respect of which such a phrase could be used without exposing its author to deserved ridicule? How does a man learn the art of literature? By studying grammar, frequenting polished society, reading critically the best authors, and correcting his own essays by comparison with their superior elegance, or by spending his time in conversing with the children, and reading the old almanacs of his native town, trusting to "nature" to come and show him how to express his thoughts in pure and noble language? What sort of figure does the painter cut whose passion for the beauties of nature urges him to attempt to depict them from inspiration, without acquainting himself with any of the technical processes by which dull pigments are contrasted, harmonized, and toned into a suggestion of light, shade, and color? A. T. can answer his own inquiry by supposing himself to be desirous of learning the art of playing the violin, instead of designing buildings. Would he, with that purpose, wait for nature to teach him the notes, the fingerings, and the positions of the bow; or would he go to a good instructor to be taught the scale, practise diligently to train his ear and hand, study Beethoven and Mozart to improve his taste, and learn counterpoint and harmony to enable him to compose with facility? That his love and observation of nature may inspire him afterward with beautiful themes is probable enough, but that has nothing to do with art, which consists in the clear, forcible, and elegant expression of an idea or emotion, not in the idea or emotion itself, which thousands of persons may share without being in any sense artists.

So with the art of architecture, which aims at the expression of a wide range of sentiments by means of materials the least tractable, and under forms the most conventional, of those used in any fine art. To employ such elements with any chance of success it is necessary to fill the mind to the utmost with examples of variations of outline, grouping, color, form, and texture, keeping them there as materials to be drawn upon as needed for producing a given effect, just as a writer searches in his memory for the precise word which will express the idea he wishes to convey. With a vocabulary composed of a few commonplace phrases the most inspired author would fail to convey much meaning; and the architect whose resources are confined to the baldness of American examples often finds his designs haunted by a painful sense of mental poverty, which he either seeks to disguise by obtrusive vulgarity, or acknowledges by a dry propriety, according to his taste.

It is this poverty of resource which travel in Europe is adapted to correct. It would be absurd to say that all the buildings on the other side of the Atlantic are beautiful, but they are different, — from each other, as well as from those of the New World, and all have a character of their own. The observant architect, whose taste has been purged of the preconceived notions about "frozen music," "the foul flood of the Renaissance," and the rest of the ridiculous clap-trap which passes current among amateurs, will find at every step suggestions of homely beauty, aristocratic reserve, or luxurious elegance, or will be struck by some picturesque mass, or distribution of light and shade. All these effects he will analyze, to discover the relations, form, or arrangement upon which they depend, and will thus lay up little by little a fund of artistic material for future use. If he can sketch what he sees, so much the better; his analysis will be far more minute and successful; but his sketch should be for that, and not as an end in itself, the main object being to store his mind with ideas, which he will assimilate and use as his own, and not to multiply examples, to be collected and used with equal want of thought.

For the study of construction, which, we are glad to see, A. T. considers to be of essential importance, European travel offers particular advantages. Independent of problems involving calculation of stress and resistance, all architects have much to learn in the way of handling the brick, stone, and wood in which their ideas are expressed, and nowhere can this handling, considered both in its practical and artistic aspect, be learned to such advantage as in Europe, where every kind of material may be seen used in an infinity of ways. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

BUILDING OPERATIONS IN NEW YORK. — The figures compiled by direction of Mr. John J. Gorman, President of the Fire Department, show that in the six months ending on the 30th of June last the Building Bureau of this city approved plans for 1,365 new buildings that are estimated to cost $26 048,705, and for 1,998 alterations to buildings, to cost $2,747,532. During the same six months the Brooklyn Building Bureau approved plans for new buildings to cost $4,831,000, and for alterations to buildings to cost $446,000.

THE LONGEST FENCE IN THE WORLD. — The longest line of fence in the world will be the wire fence extending from the Indian Territory west across the Texas Pan-handle, and thirty-five miles into New Mexico. We are informed that eighty-five miles of this fence is already under contract. Its course will be in the line of the Canadian River, and its purpose is to stop the drift of the Northern cattle. It is a bold and splendid enterprise, and will pay a large percentage on the investment. The fence will be over 200 miles long. — *Clarendon (Tex.) News.*

TREES ON THE FRENCH NATIONAL ROADS. — Statistics have been published by the French Department of Public Works relative to the planting of trees along the high-roads of the country. The total length of the Routes Nationales is 39,938,126 metres, of which 23,731,928 metres may be bordered with trees. Of this distance, 14,345,311 metres are planted, while 9,396,617 metres remain to be done. The number of trees used to form the welcome avenues is 2,601,698. — *The Architect.*

SCARCITY OF IVORY. — It is stated in the *Engineer*, that on May 15th there were only 127 1-2 tons of ivory in stock in London. The smallest stock for many years was in March last, viz.: 107 1-2 tons; the largest in July, 1878, viz.: 301 1-4 tons. At present there are probably in dealers' private warehouses about 40 tons, while at one time the private dealers used to hold over 100 tons in their own warehouses. Eight ivory cutters in Sheffield cut up £124,000 worth of tusks in a year, and the two largest cutlery houses add a value of £16,000 each per annum to that total. One-fourth of all the ivory imported into England is used in Sheffield for cutlery hafting, and other purposes. It does not appear that any really satisfactory substitute for ivory has yet been produced. The material known under various names, but generally called celluloid, has not served more than a limited purpose. The same may be said of vegetable ivory. None of these things will take the peculiar polish of ivory. An enormous trade could be done in a really satisfactory substitute for the elephant's tusks.

ACCIDENT IN A SULPHUR MINE. — The *Gazette Piémontese* reports a terrible accident in one of the sulphur mines at Caltanisetta, in Sicily. The rope by which a wagon heavily laden with sulphur was being drawn up an incline out of the "Tumminelli" pit suddenly snapped. The wagon thereupon commenced descending again, and there being no possibility of stopping it, the wagon rushed at a tremendous speed to the bottom of the pit and was instantly dashed to pieces. Owing to the high friction the brimstone burst into flames, with the most disastrous results to the miners, who were all at work at the time. As soon as the fire was extinguished there were no fewer than thirteen bodies taken out of the pit, the victims having all been suffocated and burned to death. There were, in addition, upwards of thirty miners who had received injuries, chiefly burns of a more or less serious character.

DEFECTIVE BRICK PIERS. — The committee of architects appointed by Kraft, Holmes & Co. to investigate the fall of the building lately occupied by them, in St. Louis, have made their report. It is made on calculations based on standard authorities. No defects were found except in the basement piers. The brick piers in the basement will have to carry the load of all the floors and roof added. This will be 74,100 x 5, equal to 370,500, to which add 7,410, and will have 377,910 pounds, which is 189 tons. The dimension of the brick piers being 1' 10" x 2' 5", will give 4 1-2 square feet as the area of each pier. The average crushing load of first-class brickwork laid in cement-mortar is about sixty tons per square foot, and again taking one-sixth as a factor of safety, we will have ten tons per square foot as the safe load, and if each pier has 4 1-2 square feet, it will give forty-five tons as the safe load to be imposed upon piers of this size. It will be seen from this that the load of 189 tons was four and one-quarter times as great as the pier was reasonably able to carry. It is therefore evident that the brick piers, being the weakest part of the structure, had to give way first, and they caused the disaster. While the above calculations are based upon brick piers of the very best quality of workmanship and materials, the piers in this building were not a fair average of work. — *Scientific American.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

Baltimore.

Building Permits. — Since our last report twenty-four permits have been issued, of which the following are the more important: —

Henry Frank estate, three-st'y brick building, Lexington St., bet. Eutaw and Howard Sts.

Wm. Frush, 4 three-st'y brick buildings, Presstman St., bet. Calhoun and Cary Sts.

Henry Westfall, 12 two st'y brick buildings, Heath St., beginning at the s e cor. of Byrd St.

Henry Westfall, 2 two-st'y brick buildings, Byrd St., beginning 76' s of Heath St.

Boston.

Building Permits. — *Brick.* — *Commonwealth Ave., No.* 202, Ward 11, for John J. French, four-st'y mansard dwell., 26' x 65'; Leander Greely, builder.

Commonwealth Ave., No. 204, Ward 11, for Sarah H Stratton, four-st'y mansard dwell., 26' x 65'; Leander Greely, builder.

Chauncy St., Essex St., and Harrison Ave., Ward 10, for C. D., G. H. & John Homans, trustees, five-st'y warehouse, 40' x 95' and 106'; T. J. Whidden & Co., builders.

Wood. — Warren St., rear of No. 630, Ward 21, for Ada W. Phillips, stable, 20' x 21'; J. H. Stevenson, builder.

Walnut Ave., rear of No. 209, Ward 21, for Chas. A. Dean, stable, 25' x 32'; Charles H. Blodgett, builder.

Taylor St., rear of, near Water St., Ward 24, for Albert T. Stearns, dry-house, 26' x 60'; W. G. Blanchard, builder.

Brooklyn.

Building Permits.—*Lorimer St.*, e s, 200' n Nassau Ave., 3 three-st'y frame tenements; cost, each, abt. $3,000; owner and carpenter, J. J. Randall, 126 Manhattan Ave.

Partition St., No. 90, bet. Van Brunt and Richards Sts., three-st'y frame tenement; cost, $2,750; owner, Fr. Grimmins, on premises; architect and builder, John Smidt.

Stagg St., No. 259, s s, 475' w Waterbury St., two-st'y frame dwell.; cost, $2,300; owner, H. Mahlmeister, 106 Meserole St.; architect, Th. Engelhardt.

Penn St, n s, abt. 360' e Lee Ave., 2 three-st'y brownstone dwells.; cost, each, $10,000; owner and carpenter, Thomas B. Saddington, 263 Hewes St.; architect, E. F. Gaylor.

Marcy Ave., w s, 45' s Hooper St., 2 three-st'y brownstone dwells.; cost, each, 10,000; owner, architect and builder, John F. Ryan, 187 Hewes St.

Bainbridge St., n s, 275' e Reid Ave., 8 two-st'y brick dwells.; cost, each, abt. $3,500; owner, Kate Acor, 386 Clifton Pl.; architect, Lewis Acor.

Twenty-fifth and Twenty-sixth Sts., 364' s e Third Ave., one-st'y frame stable and car-shed; cost, $12,000; owner and builder, Brooklyn City Railroad Co., 10 Fulton St.; architect, A. W. Dickie.

Sixth Ave., s e cor. Twenty-first St., 2 two and three st'y frame buildings; cost, $3,000 and $4,000 each; owner, architect and builder, E. E. Van Brunt, 179 Skillman St.

Tenth St., n s, 297' w Eighth Ave., 6 three-st'y brownstone flats; cost, each, $7,000; owner, Daniel Doody, Fifth Ave., cor. Middle St.

Walcott St., No. 88, e s, abt. 130' from Van Brunt St., three-st'y frame tenement; cost, $3,000; owner, Mr. Flynn, 90 Walcott St.; architect, I. I. Kelly; builders, P. Kelly and J. Lewis.

Sixteenth St., n s, 96' 3" e Fifth Ave., 4 three-st'y frame tenements: cost, each, $2,500; owner, Ellen F. Herman, 256 Prospect Ave.; architect, G. Herman; builders, William Thompson and Geo. Herman.

Warren St., n s, 375' w Third Ave., 15 four-st'y brick tenements; cost, each, $8,000; owner, J. W. Dearing, 434 Henry St.; architects, Parfitt Bros.; builder, G. B. Dearing.

Summit St., n s, 125' w Imlay St., three-st'y brick shop; cost, $2,500; owner, H. Van Cleef, 68 Hamilton Ave.; builders, M. Gibbons & Son.

Hall St., n s, 50' from Hopkinson Ave., 6 two-st'y and basement frame dwells.; cost, $3,000 each; owner, Joseph Peters, 438 East Eighty first St., New York; architect, George Hildenbrand; builder, John Baur.

Wallabout St., n s, 50' e Wythe Ave., three-st'y brick factory; cost, $6,000; owner and builder, K. Egan; architect, J. D. Reynolds.

Alterations.—*Willoughby Ave.*, s w cor. Throop Ave., one-st'y frame extension; cost, $6,000; owner, Throop Ave. Presbyterian Church; architect, John Mumford; builders, W. & T. Lamb, Jr., and C. L. Johnson.

Chicago.

Alterations. — The First National Bank Building, southwest corner of State and Washington Sts., has been purchased by Lucius G. Fisher, Jr. It is to be re-modelled throughout. Four more stories will be added, making eight stories in all. The cost of changes will be $70,000.

House. — L. Willoughby has taken out permit for three-story dwelling, of Massachusetts red sandstone, cor. Eldridge Court and Michigan Ave.; to cost $20,000. Cobb & Frost, architects.

Building Permits. — Wolff Bros., two-st'y and basement brick storehouse, 20' x 104', rear 373 Milwaukee Ave.; cost, $3,500.

Wm. A. Gubbins, two-st'y and basement brick flats, 22' x 42', 493 S. Wood St.; cost, $3,000.

C. O. Hausen, two-st'y and basement brick flats, 61' x 124', 334 to 342 Centre St.; cost, $35,000.

N. Flipel, three-st'y brick store and dwell., 27' x 67', 1161 Milwaukee Ave.; cost, $5,600.

C. O Hausen, three-st'y and basement brick flats, 42' x 48', 447 and 449 Hurlburt St.; cost, $14,000.

Mrs. E. Tobias, two story and basemen brick flats, 22' x 45', 920 W. Jackson St.; cost, $4,600.

Swen Nelson, three-st'y and cellar brick dwell., 21' x 48', 312 Webster Ave.; cost, $5,000.

V. Kossback, 2 two-st'y and basement brick stores and dwellings, 46' x 67', 786 to 798 W. Twelfth St.; cost, $7,500.

T. J. Hawkins, three-st'y and basement brick flats, 50' x 64', 3420 S. Park Ave.; cost, $18,000.

A. Kalousky, two-st'y brick dwell., 22' x 54', 157 Blackhawk St.; cost, $2,800.

H. Muehlhauser, two-st'y and basement brick store and dwell., 25' x 75', 321 Blue Island Ave.; cost, $6,000.

G. F. Schoeppe, three-st'y and cellar brick store and dwell., 24' x 85', 525 Blue Island Ave.; cost, $7,000.

Job Webb, two-st'y brick dwell., 40' x 46', 306 and 308 S. Leavitt St.; cost, $6,000.

A. B. Williams, two-st'y and basement brick dwell., 22' x 46', 322 N. Market St.; cost, $5,000.

F. Lingle, two-st'y brick dwell., 20' x 56', Throop St., near Twentieth; cost, $4,800.

T. Ludas, two-st'y brick basement, 20' x 22', 2457 Wentworth Ave.; cost, $4,000.

Christian Watrous, three-st'y brick dwell. and barn, 50' x 60', 728 N. State St.; cost, $20,000; J. M. Van Osdel, architect.

F. G. Whiting, two-st'y brick dwell., 23' x 51', 3148 Lake Park Ave.; cost, $5,000.

E. Lederer, two-st'y and basement brick dwell., 20' x 76', S. Park Ave. and Thirty-second St.; cost, $7,000.

F. Doorak, three-st'y brick dwell., 22' x 58', 207 Taylor St.; cost, $5,000.

F. Kovarik, two-st'y and basement brick dwell., 20' x 52', 504 Twentieth St.; cost, $3,800.

H. Bergeler, two-st'y and basement brick dwell., 21' x 51', 572 Warren Ave.; cost, $4,000.

John Reichwein, three-st'y and basement brick store and dwell., 1067 Milwaukee Ave.; cost, $8,000.

Geo. Erricson, two-st'y brick dwell., 20' x 40', 252 N. Sangamon St.; cost, $2,500.

Mary Mooney, two-st'y brick dwell., 22' x 50', 84 Johnson St.; cost, $3,800.

M. O. Flaherty, two-st'y and basement brick dwell., 24' x 65', 496 Thirty-first St.; cost, $5,000.

Cincinnati.

Building Permits. — Since our last report the following building permits have been issued: —

Arbuter Hall Stock Co., addition to three-st'y brick building, 468 Walnut St.; cost, $6,800.

Dr. Geo. K. Taylor, two-st'y brick dwell., 317 Linn St; cost, $6,000.

John Robinson, repair Robinson's Opera-House, Ninth and Plum Sts.; cost, $4,000.

Rev J. Rossiter, two-st'y frame dwell., Vine St., near Elm St., Walnut Hills; cost, $4,000.

F. Muller, two-st'y brick dwell., Liberty St., near Denman St.; cost, $4,500.

Louis Nepper, two-st'y brick dwell., Hammond St., near Vine St.; cost, $3,500.

John Wesling, repair two-st'y brick dwell., Michael St., near Burns St.; cost, $2,000.

Geo. Enger & Co., four-st'y brick carriage-factory, cor. of Gest and Summer Sts.; Chas. Crapsey, architect; cost, $3,000.

C. Massand, two-st'y frame dwell., Vine St., near Park Ave., Walnut Hills; cost, $2,500.

A. Hasselbrock, three-st'y brick dwell., Third St., near Pike St.; cost, $2,000.

Wm. E. Foy, two-st'y frame dwell., Hawthorne Ave., near Warsaw Pike; cost, $3,000.

M. Lucky, two-st'y brick dwell., Dodsworth Ave., oppos te Dive St.; cost, $2,000.

Nine permits for repairs; cost, $7,600.

Total permits to date, 394.

Total cost to date, $1,016,300.

Cleveland.

Stores. — A brick block on St. Clair St., for George Johnson; cost, $1,500; Cudell and Richardson, architects.

A brick block on St. Clair St., for J. B. Perkins; cost, $6,000; John Edelman, architect. Built by the day's work; F. H. Norton, superintendent.

A brick block on River St., for J. B. Perkins; cost, $50,000; Coburn & Barnum, architects. Built by day's work: E. Smith, superintendent.

A brick block on the Public Square, for Brainard Sons; cost, $ 5,000; Walter Blythe, architect.

A brick block on Canal St., for Sherwin Williams; cost, $15,000; C. Griese, architect; F. A. Coburn, superintendent.

Freight Depot. — Freight depot for the N. Y. C. & St. L. Railway, on Broadway; cost, $28,000; L. Cowles, architect; W. J. Scott, builder.

House. — A frame dwelling on Osborn St., for F. H. Norton; cost, $3,000; F. H. Norton, architect and builder.

New York.

Church.—A Methodist Episcopal Church with Parsonage and Sunday School is to be built at the cor of Eighty sixth St. and Park Ave. The buildings which are to be of Belleville stone will cover a lot 102' x 149'. The cost will be about $60,000; Messrs. J. C. Cady & Co., are the architects.

Store.—Nos. 134 and 136 Beekman St., are to be built up with a double store of brick with stone finish 25,' x 40', at a cost of $15,000; from designs of Messrs. D. & J. Jardine, for Mrs. Jno. Steward.

Apartment-House.—A model apartment-house is to be built at the n e cor. of Fifth Ave. and Ninth St., 53' x 100', for Gen. Daniel E. Sickles.

Building Permits.—*One Hundred and Fifty-second St*, s s, 525' w Eleventh Ave., three-st'y brick and frame tenement: cost, $4,500; owner, Geo. F. Gantz, 345 West Fifty-eighth St.; architect and builder, J. B. Smith.

Forty-second St., s s, 153' w Fourth Ave., seven-st'y fire-proof brick and stone safe deposit and storage building: cost, $300,000; owners, Lincoln Safe Deposit Co., Thos. L. James, Pres., No. 5 Vanderbilt Ave.; architect, John B. Snook; builder, Sam'l Lowden.

One Hundred and Forty-fourth St., n w cor. College Ave., 5 three-st'y brick buildings, 3 dwells.; cost, three, $4,000 each, two, $2,000 each; owner, Chas. Van Riper, 415 North Third Ave.; architect, H. S. Baker.

Fifty-seventh St., s s, 275' w Eighth Ave., 2 seven-st'y brick apartment-houses; cost, $98,000 each; owner, James A. Frame, 105 East Seventieth St.; architects, Thom & Wilson.

One Hundred and Seventh St., n s, 100' w First Ave., three-st'y brick store; cost, $7,000; owner, John Cullen, 207 East One Hundred and Sixth St.; architects, Cleverdon & Putzel; builder, M. Reiley.

Alterations. — *West Twenty-fifth St., No.* 165, five-st'y brick extension; cost, $3,000; owner, Amelia Pfletschinger, on premises; architects, Thom & Wilson.

Sixth Ave., No. 319, new store fronts on Ave. and Twentieth St., and interior alterations; cost, $10,000; lessee, H. C. F. Koch, 133 West Twentieth St.; architect, Wm. F. Hume; builder, not decided.

East Sixty-first St., Nos. 306 *and* 308, to be raised five stories and a three-st'y brick extension; cost, $23,000; owners, Rosenheim & Co., 306 to 314 East Sixty-first St.; architects, Lederle & Co.

Fifty-sixth St., n s, 320' w First Ave., to be raised one st'y and a three st'y brick extension; cost, $5,000; owner, Walter Shriver, on premises; architect, A. B. Ogden; builder, Geo. T. Dollinger.

East Thirty-fifth St., No. 161, rear, to be raised one st'y; cost, $3,000; owner, Chas. Lanier, 30 East Thirty-seventh St.; builder, Geo. Mulligan.

West Twenty-fourth St., No. 115, rear, to be raised one st'y; cost, $3,000; owner, Henry Maillard, 53 W. Twenty-fifth St.; architect and builder, Thomas Joyce.

East Tenth St., No. 220, one-st'y brick extension, fitted up for Turkish bath: cost, $7,000; lessee, Dr. Chas. Waechter, on premises; architect, Paul F. Schoen; builders, C. Huebner and C. Lehmann.

Sixth St., Nos. 727 *and* 729, one st'y brick extension; cost, $4,400; owners, Trustees of the Presbyterian Church on University Pl.; architects, J. C. Cady & Co.; builders, Sinclair & Wills and Guy Culgin.

Cedar St., No. 13, to be raised one st'y and laid out for offices; cost, $6,000; owner, Edward H. Kellogg, 17 Cedar St.; architect, A. Bernhauser; builders, Fellows & Craig and A. Bernhauser.

West Forty-ninth St., No. 26, two-st'y brick extension; cost, $6,000; owner, Joseph Cornell on premises; architect, Chas. B. Atwood; builders, Wm. Haigh and A. J. Wells & Co.

Philadelphia.

Building Permits.—*Jefferson St.*, n s, be. Bailey and Twenty-seventh Sts., three st'y shop, 24' x 35'; J. McArthur.

Sepviva St., n of Troga, 2 two-st'y dwells., 14' x 30'; W. D. Heifferman.

Cayuga St., 100' e of Seventeenth St., 2 two-st'y dwells., 17' x 58'; McLaughlin & McNamera.

Thirty-fifth St., e s, bet. Ridge Ave. and Clearfield St., 3 two-st'y dwells., 17' x 45'; McLaughlin & McNamera.

Hazzard St., No. 125, s s, 4 two-st'y dwells., 13' x 36'; J. F. Brailfield, contractor.

Green St., No. 1814, four-st'y dwell., 23' x 106'; Nutz & Worthington, contractors.

St. Louis.

Building Permits.—Thirty-seven permits have been issued since our last report, nine of which are for unimportant frame houses. Of the rest those worth $2,500 and over, are as follows: —

Sam Sacks, two-story store with living-rooms above; cost, $2,800; G. W. Pipe, architect; M. Laine, contractor.

M. Kirkwood, two-st'y dwell.; cost, $8,000; M. Kirkwood, contractor.

Mrs. Charlotte Diedrich, three-st'y furniture-factory; cost, $7,000; A. Beinke, contractor.

Mary Habackie, two-st'y dwell.; cost, $3,300; Beckmeier & Riethmann, contractors.

Charles Brener, two-st'y dwell.; cost, $8,500; A. Beinke, architect; H. Schulte, contractor.

G. Ande, two-st'y dwell.; cost, $2,800; F. Mueller, contractor.

W. D. Barter, 3 two-st'y dwells.; cost, $5,000; W. D. Barter, contractor.

Mrs. Eliza McKee, 3 two-st'y dwells.; cost, $6,400; Jas. Stewart & Co., architects and contractors.

Michael Fox, two-st y dwell.; cost, $3,100; —— Brady, architect; H. Sudhoelter, contractor.

Washington.

B. Bealle, Trustee, brick dwell., 25' x 84', three-st'y and cellar, 806 Market Space, n w; cost, $9,000.

Henry C. Coburn, 2 brick dwells., 22' x 30', two-st'y and cellar, G, bet. Twenty-first and Twenty-second Sts., n w; cost, $8,000.

W. E. Chandler, remodel dwell., I, bet. Fourteenth and Fifteenth Sts., n w; cost, $8,000.

Clark & Mason, 2 brick dwells., Vermont Ave., bet. K and L Sts., n w, 27' 7" x 40', three-st'y and basement; cost, $20,000.

Maj. Geo. Elliott, brick dwell., 24' x 34', three-st'y and basement, O, bet. Sixteenth and Seventeenth Sts., n w; cost, $5,000.

PROPOSALS.

Electric-Light. [At Chicago, Ill.]

Sealed proposals will be received by the Board of Commissioners of Cook County for putting in the necessary power, machinery, lamps, etc., complete for the proper lighting of the Cook County Court-House by electricity.

All bids must be indorsed Proposals for Lighting Court-House, and accompanied by a bond in the penal sum of $1,000, and also Certified Check for $200.

All bids must be delivered at Room 35, Court-House, **on or before 12 o'clock, M., July 17, 1882.** No bids will be considered if handed in after that time.

342 E. F. C. KLOKKE, Clerk.

Hospital. [At Chicago, Ill.]

Sealed proposals will be received by the Board of Commissioners of Cook County **until 12 o'clock, M., July 24, 1882,** for the erection three additional buildings to the Cook County Hospital.

For Blanks, Full Instructions, and Plans call at Room 35, Court-House. E. F. C. KLOKKE,

343 Clerk.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & CO. No. 343.

JULY 22, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE telegraph brings us the sad news of the death, after a long and painful illness, of Mr. Arthur Gilman, one of the best known architects of New York. Although the most active portion of Mr. Gilman's career was past, he had occupied a conspicuous position in the profession, both in New York and Boston, where he practised until within some fifteen or sixteen years. According to his own account, he was intended for the ministry, and was carefully educated at the Dummer Academy, and at Trinity College, Hartford, but his active and enterprising temper soon inclined him to more worldly pursuits, and he adopted the profession of architecture, which at that time, and in this country, was much less popular among highly trained young men than it has since become. In 1844 he published in the *North American Review* an article on American Architecture, attacking the Greek classicism which was then in vogue here, and predicting its downfall before the Gothic movement which was just beginning to show its strong vitality in England. The article attracted much attention, both in this country and in Europe, where it was translated into several different languages, and Mr. Gilman was invited to deliver a course of lectures in Boston on his favorite theme. At their conclusion he went abroad for study, receiving marked attention from the best English architects of that time, as well as from literary men and artists. Some years later, he was called in consultation on the subject of the improvements to be made in the "Back Bay" district of Boston, then an unwholesome marsh: his taste for grandiose disposition found here an excellent field, and to his persistency in urging his views upon the commissioners who controlled the work is due the adoption of a scheme which has made of a very unpromising territory the finest quarter of Boston, and one of the most beautiful urban regions of the world.

WHILE these improvements were in progress Mr. Gilman, with his partner Mr. Bryant, carried out several fine buildings in and about the city. Although he never pretended to skill as a draughtsman, he was very familiar with the best examples of his favorite Renaissance, in detail as well as in general disposition, and handled these elements through his subordinates with a success which was probably due as much to his remarkable memory as to his highly cultivated taste. His most important work was the Boston City-Hall, which, although rich and quiet, is in our judgment a work of much less artistic value than the First Church, on Arlington Street, the Brewer-Beebe houses on Beacon Street, or some other buildings of less pretension. In 1865 he removed to New York, where he was much employed in private work, and in connection with Mr. Edward Kendall devised the magnificent, if hardly legitimate, façade of the Equitable Life Assurance Company's building on Broadway. About the same time he executed an important church on Staten Island, — St. John's Church, Clifton, if we remember rightly,—and began a very large one in Buffalo, which we think is not yet entirely finished. As he advanced in life, the enthusiasm which made him one of the first and most active members of the American Institute of Architects seemed to abate, partly, no doubt, on account of his rather delicate health, and partly by reason of the incessant demands made upon his time by general society, in which he was always extremely popular; but he will long be remembered in the profession, as well as among the innumerable friends who delighted in his brilliant conversation and amiable manners.

THE great Republican holiday in France, the anniversary of the capture of the Bastille, was made particularly memorable this year by being associated with the inauguration of the new Hôtel de Ville in Paris, which was arranged to take place the day before the national celebration. For everybody except the self-styled communists the idea of republican government is inseparably connected with that of limited but real local independence, and the reopening of the great municipal palace of Paris was felt to be a serious political event. In point of fact, the inauguration was premature, the building being very far from complete; but the general desire for a patriotic demonstration, with, it is whispered, the anxiety of certain city magnates, whose terms of office had nearly expired, to make sure of having their names immortalized in the commemorative inscriptions which will be placed in the building, made it seem prudent to anticipate the proper time. Even the marble stairs were not in position, and the guests of the city were obliged to climb to the upper stories over temporary stairways covered with carpets for the occasion, while the offices of the municipal government will not be ready for occupancy for a year or two longer. The grand reception-rooms, however, are completed and decorated, so that civic entertainments can be given with something of the brilliancy which has always distinguished the festivities of the Hôtel de Ville. That the new régime will witness no diminution in their splendor is indicated by the costliness of the inaugural banquet, at which, for instance, all the guests were presented with souvenirs, consisting of little books which cost sixteen dollars apiece.

THE great competition for the German Parliament House has been decided by the award of two equal first prizes to Messrs. Paul Wallot, of Frankfort-on-the-Main, and Friedrich Thiersch of Munich; of three second prizes, to Messrs. Kayser and von Grossheim, Cremer and Wolffenstein, and Heinrich Seeling, all of Berlin; and five third prizes, to Messrs. Giese and Weidner of Dresden, Hubert Stier of Hanover, L. Schupmann of Berlin, Busse and Schwechten of Berlin, and Ende and Böckmann of Berlin. The winners of the first premiums, Messrs. Wallot and Thiersch, have been hitherto little known outside of their own districts, although the former is an architect of thorough education and extensive practice in Frankfort, while the latter was a pupil of the famous Semper, and has for several years acted as professor in the Munich School of Art Industry. It is rather remarkable that of the winners in the competition of 1872 not one is mentioned among the successful contestants of this year, although Professor Bohnstedt, the victor in the struggle of ten years ago, is said to have submitted a design.

THE people of Philadelphia have, according to some of the daily papers, been laboring under "much excitement" on account of the mysterious poisoning of the fish in the Schuylkill River. The water of the river is said to have assumed "a dark greenish color," and dead fish are lying in heaps on the shore, while, as is very natural, the residents of towns along the banks are beginning to suffer from the exhalations of so much decaying matter. The explanation of the phenomenon reminds us a good deal of the theory brought forward to account for the wholesomeness of the Passaic water. It seems that the upper course of certain tributaries of the Schuylkill lies in a limestone region, so that the water coming from them is naturally charged with salts of lime, while the Schuylkill itself flows among mines, which are continually being pumped out, and discharge a liquid containing "sulphurous acid," which under ordinary circumstances neutralizes the lime, and, we suppose, gives to the mixture that delicious character which visitors to Philadelphia know so well. Just at present, however, "by reason of heavy rains in the upper Schuylkill regions, with correspondingly less rain in the limestone regions," the equilibrium of ingredients is destroyed, "the sulphurous acid overbalances the limestone water," and the fish, unable to endure this variation in the composition of the liquid, immediately

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die. We are a little surprised at this, having supposed that if any animal life could exist in the Schuylkill, its possessors must be proof against the action of ordinary chemical reagents, but as such mortality must be not only annoying to the fish, but disagreeable to those among whom their bodies are cast, we would suggest that it might be possible to improve the character of the solution by artificial means, and that until renewed rains in the limestone regions bring down a proper dose of calcium salts, the addition of ample quantities of potash, lye or ammonia just above the point where Philadelphians take in their drinking water would undoubtedly serve to restore the chemical balance, and with it all the wonted healthfulness of the stream.

A congress of architects met last month in Paris, and although no very exciting questions were discussed, the proceedings seem to have been interesting. Among the discourses delivered was one by M. Trélat, on the higher architectural education, forming a sort of supplement to that in which he considered the general subject at the Congress of 1878. The substance of M. Trélat's views seems to be that architecture would be best taught in two successive and almost distinct stages. The first of these would be the technical training,— the acquisition, as he says, of the instruments of the art; and this portion of architectural instruction being a matter of regular progress toward an end, could with advantage be given in special schools scattered throughout the country. The second stage having for its subject architectural design simply, should, on the contrary, be confined to a single school, carrying out its course by the well-tried and successful method of competition, but increasing its usefulness by greater care than is now possible at the Ecole des Beaux-Arts in considering the comparative merit of the designs submitted for judgment. The jury, instead of being expected to act without compensation, should be paid for a service which is when properly rendered both long and difficult. The wholesome traditions of the school should moreover, M. Trélat thinks, be maintained and defended against the danger which threatens solid artistic attainment from the cloud of attractive novelties which distract the mind of the student, and waste his time in the vain pursuit of an endless succession of *amours de circonstance;* and this can best be done by placing the direction of the higher education in the hands of men of firm conviction, but freed by breadth of experience and knowledge from the prejudices of passing fashion, who should form a permanent jury to criticise or reward the work of competing students. In this way, although there might perhaps be some trouble in finding a perfectly satisfactory jury, French architecture would at least gain the advantage of being guided in a certain fixed direction, instead of wandering erratically toward all points of the compass in succession, and its ultimate progress would be so much the more rapid in consequence.

Le Génie Civil publishes a description of the present condition of the Panama Canal, as communicated to the Society of Civil Engineers by M. Hersent, one of the contractors for the work, who has just returned to Paris from a prolonged visit to the scene of operations. The high rate of mortality on the Isthmus seems to give M. Hersent much anxiety. About seven per cent of the Europeans engaged upon the canal have already perished, but there is reason to hope that the clearing away of the forests along the route will do something to lessen the fatal effect of malaria. More than half the length of the line has already been cleared of timber, and about thirty thousand cubic metres of earth have been moved, the greater part of this, however, being incidental to the preliminary works, such as railways for transportation of material, and so on. Besides the clearing of the country, in itself a herculean task, hospitals, work-shops and barracks have been constructed, and effective preparations have been made for commencing the excavations with vigor. A contract has been signed with a San Francisco firm for removing six million cubic metres, equivalent to the contents of an ordinary canal thirty feet deep and about ten miles long, and another large contract is under consideration with a New York company. Meanwhile, the machinery sent out by Messrs. Couvreux and Hersent is in operation at several points, and a serious beginning will soon be made on the vast trench, which, according to M. Hersent's observations, will *average* one hundred and thirty feet deep.

About two weeks ago, a Holland gas-burning locomotive, similar to the one which has been for several months in use for drawing freight on the Erie Railroad, was put on the regular passenger service between Paterson and New York. As our readers will remember, the main portion of the fuel consumed in this locomotive is hydrogen, derived partly from the decomposition of water, forced in the form of steam through naphtha or coal-oil, and partly from the naphtha itself. The advantages in point of portability and ready control which are offered by such a fuel are obvious, and experience shows that its use is decidedly economical as compared with coal. There seems to have been some doubt whether the combustion of the gas could be relied upon to evaporate the water in the boiler with sufficient promptness to make the engine efficient for passenger service, but the trial trip of the train to which it was attached was easily performed in somewhat less than the schedule time, and the success of the system appears to have been fully demonstrated.

Since the death of Mr. Street, the proceedings of the Royal Institute of British Architects have not been of great interest. As was to have been expected, his rival in the contest for the Presidency of that body, Mr. Horace Jones, succeeded him in the office without opposition, and Mr. Norman Shaw is to take his place as Professor of Architecture in the Royal Academy. The compulsory examination for admission to the Institute is now fully established, and no more members can avoid passing it. The consciousness of this has excited a considerable movement in the profession during the past year. We all know that "blessings brighten as they take their flight," and the prospect of the closing of the doors of the Institute has brought great numbers to seek admission. The most important discussion which we find reported at recent meetings seems to have been one on the conduct of architectural competitions, of which Professor Kerr, in introducing the subject, expressed the opinion that "when conducted at the expense of the competitors," they "constitute an unseemly and ruinous struggle for employment which this Institute cannot encourage." The "proper commercial footing" of competitions, the speaker thought, was that each competitor should be paid the regular price for his sketch; and in that case he thought the client was entitled to make his own selection of a design on such grounds as he saw fit. If any less compensation than the usual commission to each person were offered, he considered that the competitors might claim that the proceedings of award should be conducted in their interest rather than in that of the client, and that by exhibition of the designs and openness in making a selection, they should have the privilege of acquiring public reputation if they merited it. The question will probably be argued more at length hereafter, the Leeds Architectural Society having presented a serious protest against the Suggestions for the Conduct of Architectural Competitions already issued by the Council of the Institute, and many members being apparently disposed to sustain them in their objections.

An extraordinary exhibition is to be held in London next year by the British Society of Aërostation, which is to include all appliances for the navigation of the air. Many prizes are to be awarded for improvements in the form of balloons and cars, for modes of reducing weight in relation to ascensional force, and so on; and competitive trials will be made of machinery for propelling and steering balloons. No exhibition of the kind has been held since 1868, although a great advance has been made within a few years in the construction of such apparatus, and the occasion promises to be a very interesting one. Besides the persistent and systematic efforts which are now in progress among amateurs in England and France for the improvement of balloon navigation, it is said that the military authority of Russia is quietly experimenting in the same direction, and with encouraging results. Many of the most useful inventions of modern times have originated in some military necessity, and the advantage to a belligerent power of possessing a manageable air-ship, by which, with the help of a few barrels of dynamite, all the fortresses and cities of the enemy could be destroyed successively in a few hours, would be so enormous that if the Russians should be suspected of having succeeded in their attempts, we should soon see all the army engineers in Europe intent upon the same problem, aided by all the money which, when there is any question of slaughtering one's fellow beings, is so liberally poured out.

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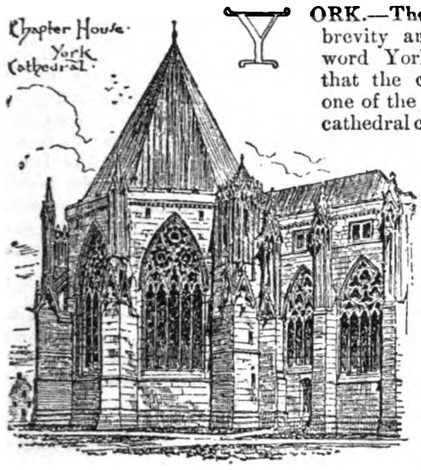
THE ENGLISH CATHEDRALS.—III.



YORK.—There is something in the brevity and masculinity of the word York that makes one feel that the cathedral here must be one of the most robust of Norman cathedral churches, so that it is with some surprise that one finds the present building was constructed during the Early English, Decorated and Perpendicular periods of Gothic architecture.

The first intimation of a church is a statement that the Saxon king Eadwin was baptized in 627, in a small wooden church hastily built for the ceremony on the site of the present building. This building was included as an oratory in the stone basilica which the king began to build immediately after his conversion, but the work must have been poorly done, for in 669 the building was already in decay, and was finally destroyed by fire in 741. The records are imperfect, but there is reason to believe that the building which replaced this in 767 was built upon the same site. For some three hundred years this was the metropolitan church of Yorkshire, until in 1069 it was in turn destroyed by fire during the Conqueror's harrying of Yorkshire. A portion of the choir crypt is the only relic of the Saxon building which now remains in the Cathedral.

Between 1070 and 1100 an entire Norman church was built which continued until 1154, when began the series of alterations and enlargements which has resulted in the existing building.

The following dates have been assigned:—

Uncertain date. *Saxon.*—Inner wall of crypt.
1070–1100. *Norman.*—Remains at west end of crypt.
1154–1181. *Late Norman.*—Eastern portion of crypt.
1215–1256. *Early English.*—North and south transepts.
1285–1345. *Decorated.*—Nave and chapter-house.
1361–1373. *Early Perpendicular.*—Lady-chapel and presbytery.
1373–1400. *Perpendicular.*—Choir.
1405–1470. *Late Perpendicular.*—Central and western towers.

Although no good general view of the building can be obtained, enough can be seen to prove that it deserves its reputation as one of the grandest and most impressive cathedrals in England. This is largely due to the great height of the roofs (99′ 6″ in the nave, 102′ in the choir) which are more lofty than in any other English cathedral.

Within our own times the Cathedral has suffered from the great arch enemy of architecture: On the night of February 2, 1829, the choir was set on fire by a lunatic named Martin, who had concealed himself in the building for the purpose. All the wood-work was destroyed, including the roof which because of the great span, 99′ 6″, had been covered by a wooden roof like the nave, which also a few years after, in 1840, suffered a similar disaster, the fire in this case being caused by the carelessness of workmen engaged in repairing the clock in the southwest tower. To restore the building in the first case some £65,000 were expended by Sir Robert Smirke, while in the second case the restorations under Sidney Smirke cost £23,000.

The view across the transepts closed by the famous window of the "Five Sisters" in the gable end of the north transept is considered one of the finest interior views in England. The fame of the "Five Sisters" is, however, eclipsed by that of the great east window of the choir which is the largest window—it measures 78 feet high x 33 feet wide—in England which retains its original glazing. The east window of Gloucester Cathedral is somewhat larger, measuring 38′ x 72′, but it is only partially glazed. As these enormous walls of glass are a peculiarity of English church architecture, these windows are the largest in the world. The contract for glazing this window is dated December 10, 1405, the time for completion is limited to three years, and the pay of the artist, one John Thornton of Coventry, was four shillings a week, with a gratuity of five pounds per year and ten pounds on the completion of the work, the Chapter, of course, furnishing the material and workmen.

Before the fire of 1829 only a very small portion of the crypt was known, but the repairs made at that time showed that the greater part of it had been filled up immediately after it was built, and within the central part of the extreme western end was discovered a massive wall whose coarse herring-bone work proved it to be probably a part of the original Saxon church.

The central tower of the first Norman cathedral was allowed to exist, and its piers now form the cores of the present tower-piers cased with Decorated and Perpendicular masonry, according as they abut on the nave or choir. The permanent roof was put in place in 1472. The western towers are two hundred and one feet high. The southwest tower was much injured by the fire of 1840, which began in it, and the bells were destroyed. A new peal of twelve bells was hung in it in 1843, one of them, for a long time remaining the largest bell in England, measuring as it does 7 feet 2 inches in height and 8 feet 4 inches in diameter, and weighing 10 tons 15 hundredweight.

One of the peculiarities of the building is the record of the benefactions it has received, which are evidenced by the multitude of armorial shields and bearings which are introduced as decorations in the spandrels of the nave arches, in those of the main arches of the choir and presbytery, in the transepts, and in the spandrels of the arches of the central tower.

It is generally admitted that the merit of the Early English chapter-house is no more than fairly expressed by the ancient verse painted on the left side of the entrance:—

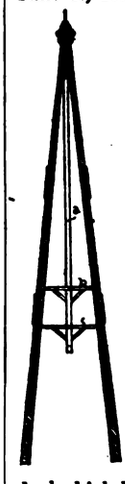
Ut Rosa flos florum sic est domus ista domorum

CHICHESTER Cathedral stands partly on the site of a Saxon monastery, and the first cathedral-building was finished in 1108, only to be partly destroyed by fire six years later. Restorations were at once begun, but were not completed until 1148. Again it was burned in 1187, and rebuilt and enlarged between 1187–1204.

The following dates have been assigned to different parts of the existing building:—

1114–1204. *Norman.*—The greater part of the existing cathedral.
1223–1244.—The nave aisles.
1288–1305.—The Lady-chapel.
1305–1336. *Decorated.*—Central tower.
1336–1337. Central spire.
1305–1336.—The detached campanile, the only English example, is built.

Chichester Cathedral was occupied by the Parliamentary troops in 1643, who did the usual amount of damage. Important restorations were made between 1843 and 1856, and again in 1860, and later still upon the central tower, which, in spite of the ingenious pendulum hung in the spire by Sir Christopher Wren when he rebuilt it, followed the example of other cathedral towers and dissolved in ruins a few years ago.



Elmes gives the following account of this pendulum, which was intended to counteract the force of the southerly gales which had already affected the perpendicularity of the spire:—"To the finial is fastened a strong metal ring, and to that is suspended a large piece of yellow fir timber, 10′ long and 13″ square; the masonry at the apex being from 9″ to 6″ thick, diminishing as it rises. The pendulum is loaded with iron, adding all its weight to the finial, and has two stout oak floors, the lower one smaller by about 3″, and the upper one by about 2¼″ than the octagonal masonry that surrounds it. The effect in a storm is surprising and satisfactory. While the wind blows high against the vane and spire, the pendulum touches on the lee side and its aperture is double on the windward; at the cessation it oscillates slightly and terminates in a perpendicular. The rest of the spire is quite clear of scaffolding. This contrivance is doubtless one of the most ingenious and appropriate of its great inventor's applications."

Small though it is, the nave has the striking peculiarity of double aisles,—the only other English cathedral which has them being Manchester,—which brings it about that after York Cathedral this building has the widest nave (91′) in England.

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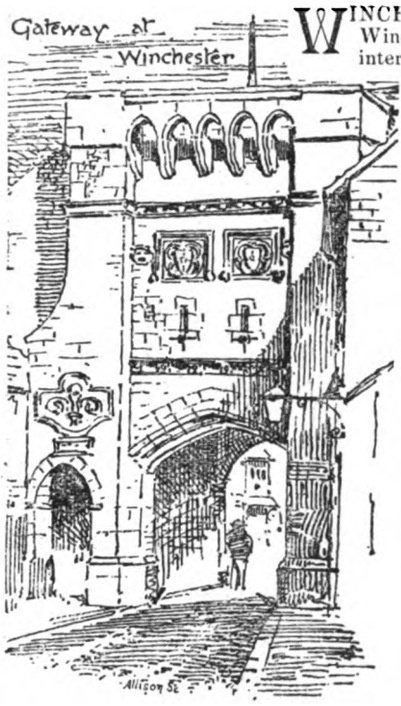


WINCHESTER. — In many ways Winchester is one of the most interesting cathedrals in England, and the following dates may be assigned to its history: —

1079–1093. *Norman.* — The original building is erected by Bishop Walkelin.

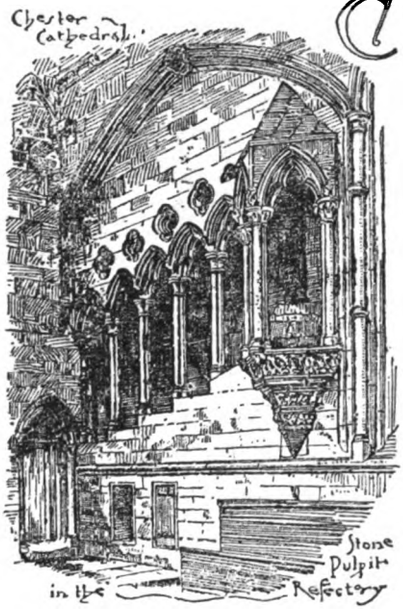
1189–1204. *Early English.* — Considerable additions to the eastern part of the cathedral; the eastern aisles and chapels behind the presbytery.

1320–1345. *Decorated.* — The piers and arches of the presbytery.

1345–1486. *Perpendicular.* — The present nave.

1345–1366. The west front.

Modern investigation shows, we believe, that the nave of Winchester is the longest internally, although the naves of Ely and Canterbury exceed it in external length. The nave is peculiarly interesting in that the present structure includes within its bosom the original Norman stone-work, the adaptation from Norman to Perpendicular having been made with consummate structural skill. The tower which fell was rebuilt about 1107.



CHESTER: — It would be difficult to find a building more out of harmony with its surroundings than is the cathedral at Chester. Any one who has had the fortune to see the old church of St. John, whose tower fell last year, before he sees the Cathedral cannot help feeling that an injustice has been done in not allowing the former to remain the chief church of the diocese.

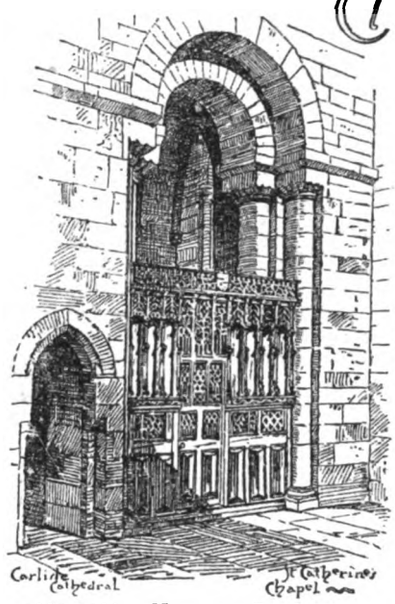
Until 1541 the Cathedral was only the monastic church of St. Werburgh — for Chester formed a part of the diocese of Lichfield — her relics being brought to Chester in 875, and in their honor the "mother church" of Chester was enlarged and rebuilt in the first part of the tenth century. About 1075 the church was again rebuilt, and was thenceforward known as the Abbey of St. Werburgh. Any one who is familiar with the ruinous condition of the exterior stone-work a few years ago will understand what need there was of again rebuilding about 1194. As the Lady-chapel, chapter-house, and refectory are Early English in style, they must have been built about this time.

In the period 1485–1492 the nave, tower, and south transept are said to have been rebuilt. In short, the whole eastern portion is Early English; the rest is Decorated with Perpendicular alterations and additions.

In 1844 the restoration of the choir was begun by Mr. R. C. Hussey; in 1855 the Lady-chapel was partially restored, and in 1868 the general restoration of the Cathedral was intrusted to Mr. G. G. Scott. Before these restorations were begun the outward appearance of the building can best be conceived by imagining that instead of stone blocks of ice had been used, and after the building was completed the whole had been submitted to a long thaw, which of course had acted most rapidly on the joints and arrises.

One of the singular features of the Cathedral, as singular ecclesiologically as architecturally, was the occupation of the south transept as the Church of St. Oswald by, we believe, a dissenting society, who were only lately induced to leave the building by the building of a new church in the Parkgate road. Architecturally, this transept with its aisles and great projection is almost as important as the nave, while the north transept is but a single bay and has no aisles; it has, however, a fine flat ceiling of Perpendicular wood-work.

The latest restoration of the choir has been quite radical, including the rebuilding of the apsidal end of the south aisle, which is crowned with a stone pyramidal roof some 41 feet high, a unique feature in English architecture, though not uncommon along the Rhine. The Perpendicular cloister is remarkable only from its being on the north side of the building instead of the south, and is therefore unusually gloomy and cheerless. The refectory on the north side of the cloister is now the King's Grammar School. The lector's pulpit in the refectory still remains, and is one of the finest in existence. Local tradition has it that the site of the Cathedral was once occupied by a temple to Apollo.



CARLISLE.—Carlisle Cathedral is distinguished by having a nave of only two bays and dark narrow transepts which project only one bay beyond the choir, which thus becomes the most important part of the building, the more so because the nave is walled off from it and is used as the parish church of St. Mary. William Rufus in 1092 began to restore the town—the British Caer Luel, the Roman Lugubalia — which for more than two centuries had been deserted, and shortly after a church was begun which, after the usual vicissitudes, remains to us as the present Cathedral. The record of the changes and disasters it underwent is very imperfect, but the following dates have been assigned: —

1092–1130. *Norman.*—South transept, piers of central tower, and portion of nave, now St. Mary's Church.

1219–1260. *Early English.*—Walls and windows of choir aisles, St. Catherine's Chapel and portions of main arcade.

1292. *Early Decorated* (*Geometrical*).—Portions of main arcade of choir.

1353–1395. *Late Decorated* (*Flamboyant*). — Upper part of east end and roof of choir.

1400–1419. *Perpendicular.*—Upper part of tower.

1853–1857.—Extensive repairs and restorations under Mr. Ewan Christian.

The original Norman nave consisted of eight bays and it is almost certain that the whole exterior was stuccoed, the mouldings and joints being picked out with color.

RIPON. — One of the most noticeable features of the present plan of Ripon Cathedral is the shifting of the axis of the choir to the south which causes the piers of the central tower to be placed at the angles of a trapezoid, an arrangement necessitated by the crypt beneath.

The following dates have been assigned: —

——— *Saxon.* — Crypt.

1070–1100. *Norman.* — Portions of chapter-house and crypt below it.

1154–1181. *Transition Norman.*— Transepts, three bays of north side of choir and portions of nave piers.

1215–1255. *Early English.* — West front and west towers: vaulting and circular windows of the chapter-house.

1288–1300. *Early Decorated.* (*Geometrical*).—Two easternmost bays of the choir.

1460–1520. *Perpendicular.* — South and east sides of the central tower; east side of south transept wall; two bays of south side of choir and the nave.

1862. Restorations under the charge of Mr. G. G. Scott.

The Basilica of St. Wilfred founded in 664 was not on the site of the present building, but it is thought that he founded a second church which was. The present building as an entirety dates from 1154.

The Scots set fire to the building in 1319, and restorations were made after this. About 1454 the central tower had fallen into ruins,

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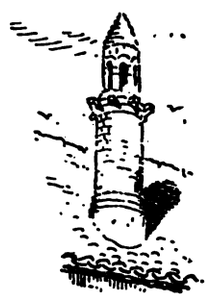
and was then rebuilt, and in 1593 the wooden spire on this tower was struck by lightning, and finally in 1660 was blown down, demolishing in its fall the choir roof. At the time of rebuilding this spire the two western spires were removed so that similar mishaps might be avoided.

The cathedral is so closely surrounded by buildings that it is impossible to get a good general view of it.

NOTES ON HOUSE-DRAINAGE. – II.[1]



AMERICAN convictions concerning house-drainage, formulated as described at the opening of these papers, are crude and incomplete. I refer of course only to "popular notions" on the subject.

Nothing is more common than the remark that a house or a town must be well drained because it stands on high ground with a rapid slope away from it. So far as the removal of its waste matters is concerned, such a site certainly offers excellent advantages for drainage, but it by no means follows that these advantages have been availed of. There is as much bad work and as much foul deposit in connection with such houses as with others,—and bad work and foul deposits are almost universal.

If a question is raised as to the condition of the drainage of a house of the better class, the owner usually considers it settled by the very simple answer that he has recently had the whole establishment thoroughly examined and overhauled by his plumbers, and therefore knows that it is all right. The fallacy underlying this reply is of almost universal application. It by no means suffices to have a house examined and its drainage-work remodelled by a plumber. I refer, now of course, to the average, respectable plumber. There are a few—a very few—men who are so well informed as to actual sanitary requirements that their judgment as to the condition of soil-pipes and appliances is of great value. But, with these rare exceptions, plumbers of the best class are men who have learned their art in the shop, whose learning dates back many years, and who are filled with the not unnatural belief that what they have learned in their practical work is the sum of valuable human knowledge on the subject. Little by little, and year by year, they have been slowly converted to the advantage of one improvement after another. Almost universally they are at least several years behind the times in their full appreciation of the need for improvements. Ordinarily, they have themselves constructed the work they are called on to examine, and they erroneously think that a condemnation of what they did and were well paid for doing five years ago would be a confession of error, and a condemnation of their own judgment. Their great mistake lies in a failure to appreciate the fact that five years ago no one knew nearly so much as is now known of the essential requirements of house-drainage. Then again, they are business men, making their way against sharp competition, and they know that if they cannot satisfy an uninformed house-holder for a price he is willing to pay, they will be suspected of imposition, and that a real impostor will get the job. They therefore pass over many things of the construction of which they would not now be guilty, — and from their own ignorance they neglect recent improvements which have been demonstrated to be most important. Consequently, before a house-owner can be entirely satisfied that his drainage-works are safe and right, he should first inform himself thoroughly as to the leading principles, then with the help of a plumber he can trust to be thorough, he should *examine for himself* the deviations of his own work from a sufficient conformity to these principles.

That there should be a ventilation-pipe at the top of the soil-pipe is now almost universally understood; that it should be as large as the soil-pipe is a fact that is quite generally accepted; that it should be considerably larger than the rest of the soil-pipe is a new ray of light which has thus far penetrated but little way; that the office of this open pipe above the roof is only very partially and imperfectly performed unless there is a free admission of fresh air at the foot of the soil-pipe has only recently been understood by professional sanitary engineers. If anything in connection with house-drainage is well demonstrated, it is that there should be a free circulation of air through the whole length of the pipe from bottom to top. It is one of the curiosities of the work of house-inspection to find, as we often do, that the builder has in so far made a concession to popular prejudice, or to the requirements of Boards of Health, as to fasten a length of open-topped pipe on the outside of the roof, giving it no connection whatever with the soil-pipe. The small pipes, from one to two inches in diameter, carried through the roof from the highest trap in the house, closed at the top and perforated with a few holes, or left open and turned downward with a "return bend," were, at the time they were first introduced, a great advance, but their total inadequacy has been fully demonstrated and they can only be regarded as better than no venting. They are at best only vents,—never ventilators. The covering of the upper ends of soil-pipes with caps and ventilating cowls of various forms has been shown by the instructive experiments carried on at Kew Gardens under the direction of Rogers Field, Douglas Galton and William Eassie, to be probably in all cases, a mistake. It is now known that such appliances are at times an obstruction to ventilation; that an open, straight pipe is better,—because better in calm weather,—than a pipe furnished with any kind of cowl, and that the best way to increase the discharge of air is to increase the diameter of the pipe considerably at its upper end.

All who have had to do with sanitary inspection must have been struck with the frequency of the conclusive assertion on the part of the house-owner that he has paid "frightful plumbing bills," and has spared no expense to have everything as perfect as it could be made, being determined that, whatever else might be defective about his house, its drainage should be complete in every particular. As a rule, and a rule almost without exception, if he had given more time and thought and personal attention to the subject, he would have spent much less money and would have secured much better work. Indeed, it is hardly incorrect to say, taking one "first-class" house with another, that the safety and sanitary perfection of the plumbing work is almost in inverse proportion to its cost. As a rule architects leave the details of plumbing work almost entirely to plumbers. The proprietor is desirous of securing all of the conveniences that the plumber has to offer, and the plumber finds it to his interest to increase the number of these appliances as much as possible. The result is, among other things, a complication of the work that leads to danger. The most important advance that has been made in recent years in connection with this subject has been in reaching the conviction that the first requirement in the drainage of a house should be the greatest simplicity of arrangement consistent with comfort and convenience.

We are beginning to recover a little, but only a little from the general tendency to ascribe our worst evils to the public sewer. In England even more than here it is considered the first and most important duty of the house-drainer to "disconnect" the house-drain from the sewer or cesspool, by the establishment of a trap in the course of the house-drain beyond the fresh-air inlet which is to serve for the ventilation of the interior pipes. Those who know by long observation the condition of an ordinary sewer and the condition of an ordinary house-drain understand very well that almost invariably the latter is infinitely the worst of the two. However foul the most defective sewer may be, it is rarely if ever so foul as the average horizontal soil-pipe or drain which leads to it from the house. It is generally better flushed, and, even where unventilated, the volume of its air is generally such as to afford better dilution. The amount of decomposition and the amount of "sewer-gas" produced thereby is generally greater in the house-drain than in the sewer. It is not to be understood from this that the condition of the ordinary sewer is to be disregarded, for it is generally extremely bad, only that, however bad it may be, and however much it may need our attention, the *first* interest of the house-owner lies in and applies to the condition of his own interior-work; disconnection from the sewer where needed is a simple affair.

The most important present duty,—a duty which it will be attempted to perform in the writing of these notes,—relates to the reformation and direction of public sentiment on the subject. If the requirements of the best work can be so stated as to appeal to the intelligence of the average householder and to the professional builder, it is to be hoped that a clearer understanding of the subject will lead to the universal adoption of such reforms as will allay the apprehension with which all classes now regard the artificial appliances for the removal of the foul wastes that our artificial life causes to be produced under such difficult conditions.

[1] By George E. Waring, Jr., Newport, R. I.

BOULLE, THE CABINET-MAKER.

MUCH interest has been excited by the very large sums that have been recently realized at the sale of the Hamilton Palace Collection by several specimens of the cabinet-maker's art, and among them a number of pieces of the work commonly known as "Buhl." At a time when our most respected authorities have been striving their utmost to call the attention and admiration of the public to the work of artists of earlier days and their purer and more refined creations, such an event as the sale for thousands of pounds of pieces of furniture belonging to the seventeenth and eighteenth centuries is somewhat calculated to disturb the minds of the less thoughtful public. Of the less thoughtful we say, because there exist reasons why such sums should be paid for the choice cabinets, the *secrétaires*, the *commodes*, and the tables, which have recently realized at the Hamilton sale such incredible prices. Putting aside all rigorous standards,—above all the artist should, in his admiration be as eclectic as he is the very opposite in his creations,—putting aside, we repeat, all æsthetic standards, how is it possible to deny that these works were produced in the true spirit, however degraded, as we shall be told, the designs and traditions may have been on which artists such as

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Boulle and Riesener worked? To what monstrosities of so-called industrial art has not the name of the former of these two artists been given? "Buhl" work as it is erroneously termed by us, has long since, in England at least, received at the hands of our leaders in taste an amount of quiet abuse which, with all but those who do not merely allow themselves to be led by the opinions of others, has banished forever from the homes of those who respect themselves any creations of the reign of the fourteenth Louis. In France, however, such prejudices are not allowed to influence people of taste, and the memory of Boulle as an artist, a good workman, one of the glories of the *grand siècle*, and as a collector of the works of art, is not entirely forgotten, though there, almost as much as with ourselves, his memory has been so associated with the work which is known familiarly by his name, that its connection with its creator has been overlooked, and *meubles de boule* are spoken of by our neighbors in much the same manner as we on our side speak of "Buhl work."

The sources of information respecting Boulle are few: the lives of the great artisans of the world are scarcely of the eventful nature that fills biographical dictionaries and the pages of history, and where they have not, like Palissy, left behind them their memoirs, or, like our own Chippendale, published elaborate works on their art, or, like Bréguet the watch-maker, entered the French Academy, we are like to know little of their obscure origin, their early struggles, and their uneventful life-long industry. In the "Biographie Universelle" not a word is to be found concerning the great cabinet-maker of Louis XIV, whose creations crowd the galleries of Versailles. Indeed, were it not for the recent researches of the compilers of the "Archives de l'Art Français," and the by no means common pamphlet by M. Asselineau on Boulle, we should have but few published sources of information on the worthy artist.[1]

Boulle, it would appear, was born in Paris in 1642, a Protestant, though we have evidence that he died a Roman Catholic. From the contemporary evidence of the Padre Orlandi,—in his "Abecedario,"—it would seem that young Boulle early showed his artistic taste, desiring even to become a painter, and only departed from his course at the express wish of his father, who looked to him to continue his profession as cabinet-maker. It is easy to see how greatly this early influence affected the young man's after-life and revealed itself in the less-thought-of productions of his genius. We have probably little cause to regret his forced step. As a painter we know very well what he would have been under the over-towering contemporary influence of Lebrun. Respecting the early years of Boulle's life we know nothing; in all probability they were passed in the long and industrious apprenticeship which was considered necessary in the past to make the good workman. But that the young man must early have shown his power is evident from the fact that at thirty he was already famous. His *brévêt de logement*, which gave him at the king's hand a permanent lodging in the royal palace of the Louvre, is dated 1672, and is, we see by the document, accorded him for his "experience" as an *ébéniste, faiseur de marqueterie, doureur et ciseleur.*"

There is a story, one which would go far to show the instructive value of museums and works of art with the student, that on the Sundays, when the great galleries were open (we recommend this incident to all interested in the views of the Sunday Society) young Boulle used to visit the palaces of the Louvre, Saint Germain and Marly, and return with his mind full of what were termed the wildest fancies. One day, the story goes, his master took him to Versailles to execute repairs, which occupied some little time; the effect of the visit and the sight of the marvels which "the grand monarch" had called into being on the great sandy plain of Versailles, appears to have operated a positive effect on the impressionable mind of young Boulle, and on his return his imagination was actively employed in the design of pieces of furniture suitable to adorn rooms such as he had seen in the king's palace. A royal competition—for competitions date from before our time—gave the young man the opportunity of manifesting his skill, and, through the influence of the king's favorite, Mdlle. de Fontanges,—nor does favoritism belong exclusively to our days,—Boulle found his designs accepted; *carte blanche* was given him to carry out his conceptions, and the enchanted monarch who found in the young artist a worthy decorator of the magnificences which Lebrun and Mansard had created, accorded him for his life-time his protection and patronage. The apprentice had at length realized his dreams: he had stepped from the narrow sphere in which he had so long regretfully vegetated, and the glory he had so long sighed for had come.

The numerous commissions which from this time crowded in upon Boulle he appears to have found himself incapable of carrying out. Letters in existence show the sad complaints of the Dauphin — the son of Louis XIV — respecting the delay in sending home a certain cabinet, a marvel of design in mirrors and marquetry; while Crozat, the wealthy banker, we find, even brought an action against the artist for his neglect in complying with his instructions. The liberality of the king was great, and it is at first sight difficult to understand how it was that throughout his life Boulle appears to have been constantly troubled with pecuniary difficulties. The truth is, there still remained in him the soul of the painter he in his youth had aspired to become, and Boulle, we find, was what is understood as a collector, a collector who never missed a single sale of rare prints and drawings, raising money in every direction to satisfy his passion, and finally being almost broken-hearted by the destruction by fire of the greater part of his treasured gatherings, which, from all accounts, would appear to have been one of the most interesting and complete then in existence. His losses, indeed, he estimated at over 15,000*l.*, a very large sum for two hundred years ago. The sale of the remains of the collection, which took place at his death, occupied many days.

Boulle died at the age of eighty-two (February 29, 1732) at his home in the Louvre, and was buried in the neighboring church of St. Germain l'Auxerrois, leaving two sons to continue, only in name it is true, the traditions which he had in a measure positively created. One of the sons, employed at the Sèvres manufactory, was, it would appear, the first to introduce, in the decoration of furniture, the use of porcelain.

The secrets of Boulle's skill may be said to have died with their inventor, for though the traditions were continued, the sobriety and the grandiose style of the master will be found to be sadly wanting in all the work of his imitators. So much was this recognized that, throughout the last century, in all the sale catalogues the works by Boulle himself are conspicuously marked, and more than one collector made it his specialty to gather specimens of the great cabinet-maker's work. The finest of his creations, were, of course, made for his royal patrons, and more than one piece in the terrible years of the Revolution was to pass into this country; thus several of the specimens of Boulle work in the Hamilton Palace collection have originally come from the palaces and châteaux of the French kings. That the sums which already several of these pieces have realized are not the result of mere caprice may be judged when it is remembered that in the last century specimens of Boulle work invariably fetched almost equally large sums.[2]

It is only when one has had the opportunity of seeing and studying a fine specimen of genuine Boulle work, that the superiority of the original to the imitations which bear his name can be thoroughly appreciated. There is a sobriety of tone and treatment, of line and proportion, a grandeur of style, a balance of light and shade, of dark and light, of bright and dull, of brass and white metal (pewter), of tortoise-shell and lacquer,[3] which will be found to be absent from the work of his successors and imitators, and utterly wanting in the coarse crude abortions which have been at all times forced on the public attention under the deceptive title of "Buhl work." Even in the most conscientious of his successors, such cabinet-makers as Crescent and Caffieri, — who lived in the times of the Regent, contemporary with our Queen Anne, — the prevailing Rococo taste it is easy to see overcoming what little classical severity was left in the seventeenth-century work of Boulle, who largely drew his inspirations from the architectural models that he made his constant study. When we add to his merit as a designer and a delicate appreciator of the work of others, his merit as a good workman whose productions, without need of repair, are as stout in the present day, after two hundred years of use, as they were the day they were made, it may be fairly conceded, even by the sternest rigorist, that André Boulle worked in what is understood as the true spirit. Not only in its construction, but in every feature, in the choice of the materials, in the chasing and gilding and the marquetry, his work will be found to be of the honestest, very different to the modern rubbish that passes under his name, where false tortoise-shell, made of horn or gelatine; false mother-of-pearl, box or horn instead of ivory; brass or even zinc lacquered ornament tacked on to ill-made joinery usurp the place of true work, whose only fault was that it was produced in a period when the traditions of art were on the decline. When Boulle used wood it was ebony, which the cabinet-makers, his successors, on the plea of its difficulty in working, in taking the glue or the varnish, — Boulle never used varnish, — and other reasons, replaced with stained pear-wood. In the choice of his woods Boulle showed the extremest care, and one of his severest blows was his loss by the fire that destroyed his collection of prints, of a quantity of rare woods which he had, we learn from the inventory he made at the time, long stored by to season. The bronze he used was honestly chiseled and chased and gilt, not lacquered, and each ornament was a design not stamped out.

It is somewhat sad and calculated to rouse reflection, the difference between the spirit in which Boulle produced his work and that in which his successors now produce theirs, — the relative position of the so-called industrial arts in the present day compared with those even of his time two hundred years ago. The workman in the past was an artist. Boulle, not to mention many others of an earlier period, was an artist: he conceived his own designs, he drew them out (his patent is given him in his name not only as a cabinet-maker, but as an architect and sculptor), he executed everything with his own hand, — he was a chaser, engraver, and gilder; he was, as we see, a man of cultivated tastes into the bargain.

The division of labor, with its inevitable result of work without intelligence, without good faith, has made the modern workman what he is generally called,— a mere machine; he is in reality only a cog-wheel of a machine. Talent cannot be said to be wanting, nor

[1] "André Boulle, Ebéniste de Louis XIV." By C. Asselineau. Paris, 1872; 44 pp. Seventy-six copies only were printed. One will be found in the library of the South Kensington Museum.

[2] Boulle is known to have made for the banker Bernard a writing-table at the cost of 50,000 francs (£2,000), but in the Revolution this *chef d'œuvre* is believed to have either been destroyed or gone astray.

[3] It may be remarked that the presence of lacquer panels in Boulle work must be looked on with some suspicion: it has long been usual to replace by such panels the injured work of an original. When Boulle used Oriental lacquer, which he occasionally did, its quality was invariably of the very finest.

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No. 343 American Architect and Building News, July 22, 1882.

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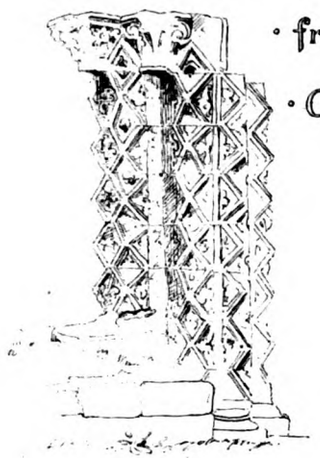
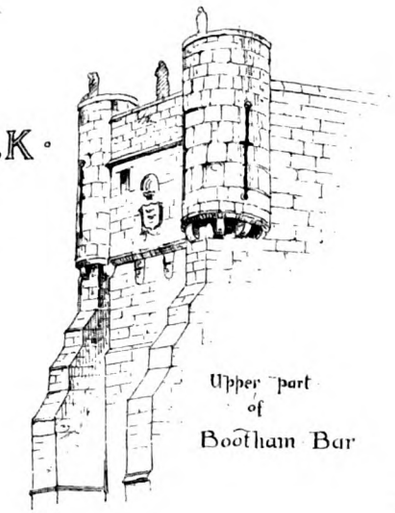
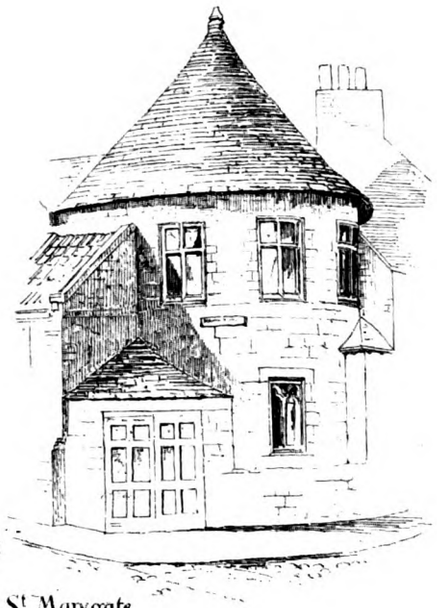
Sketches from OLD YORK



at St. Mary's Abbey



Upper part of Bootham Bar

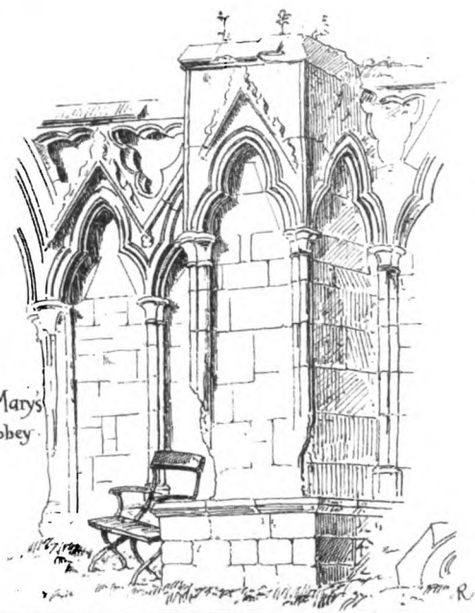


Hamlet of St Marygate

St Mary's Bishop-hill Jr

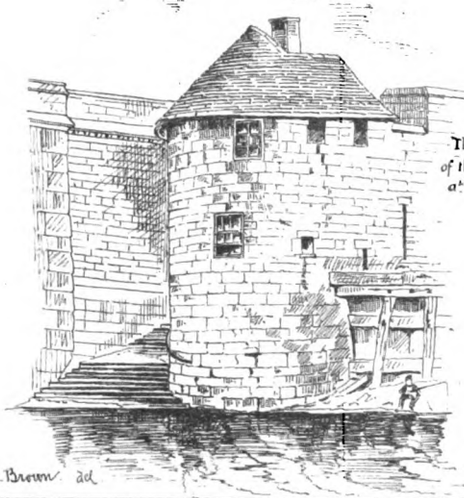
Door at the Almshouses Bootham

Petergate from Christ Church



at St Mary's Abbey

R. Brown del



The end of the city wall at the river Ouse

The Heliotype Printing Co. 24 Tremont St. Boston.

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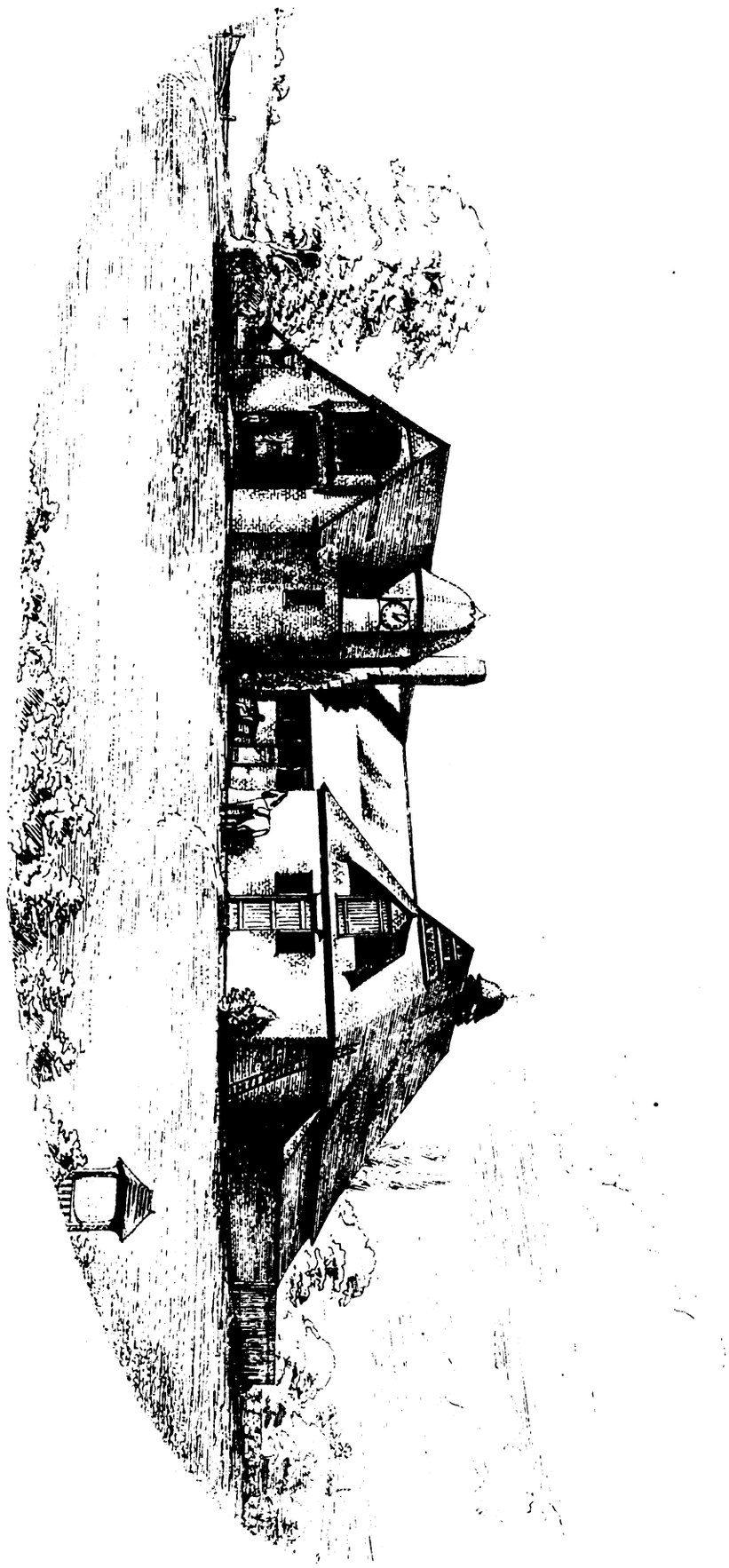
—PRESQUE MAIS—



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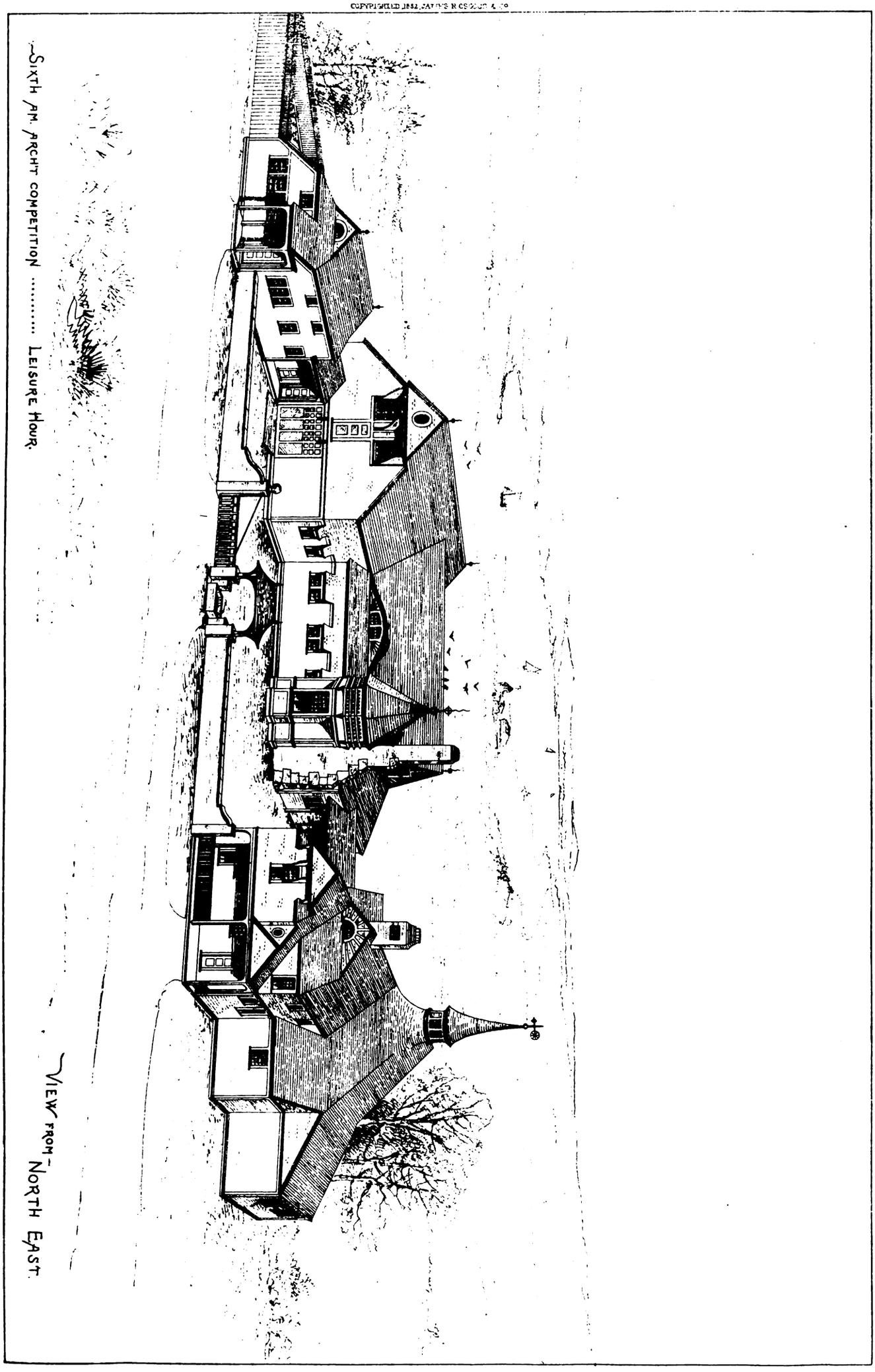

SIXTH AM. ARCHT COMPETITION ..... LEISURE HOUR.

VIEW FROM NORTH EAST.

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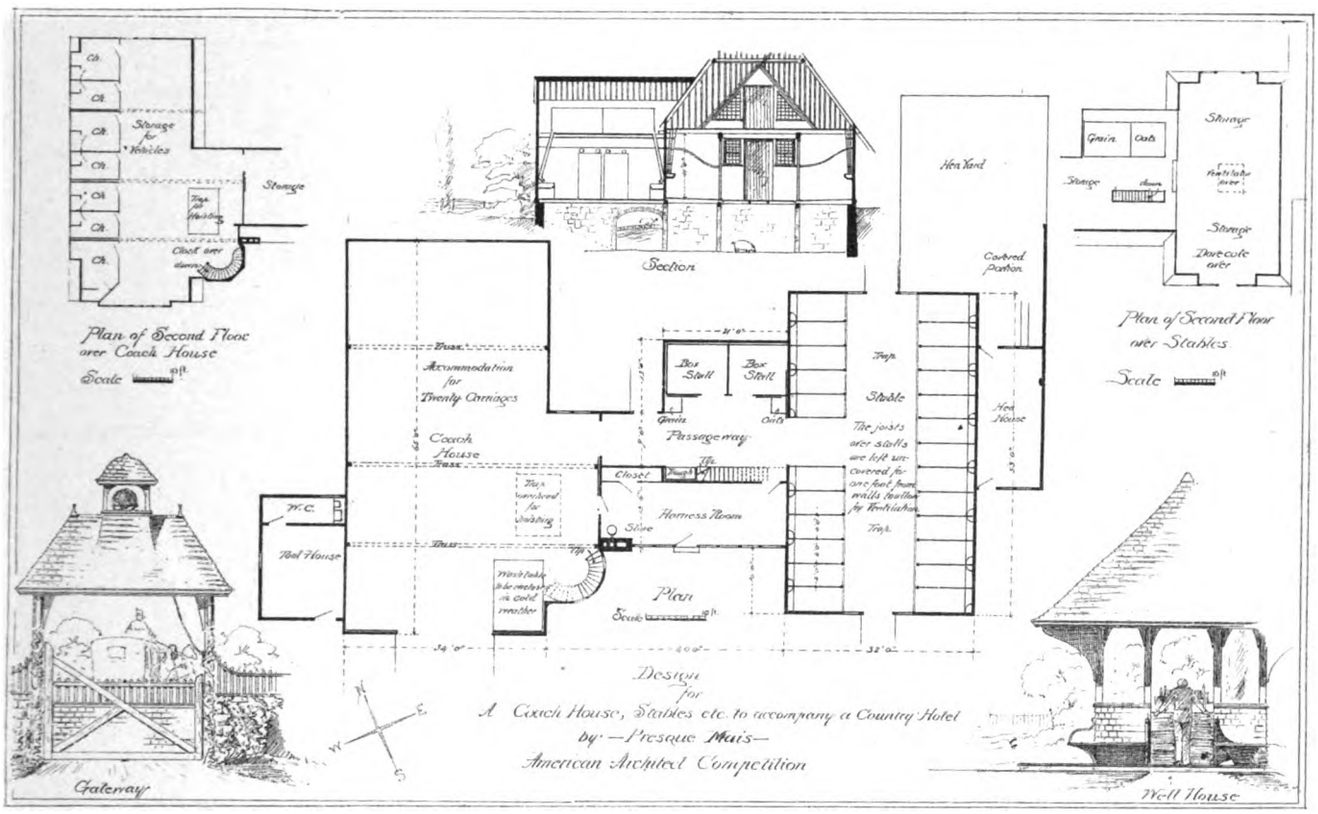

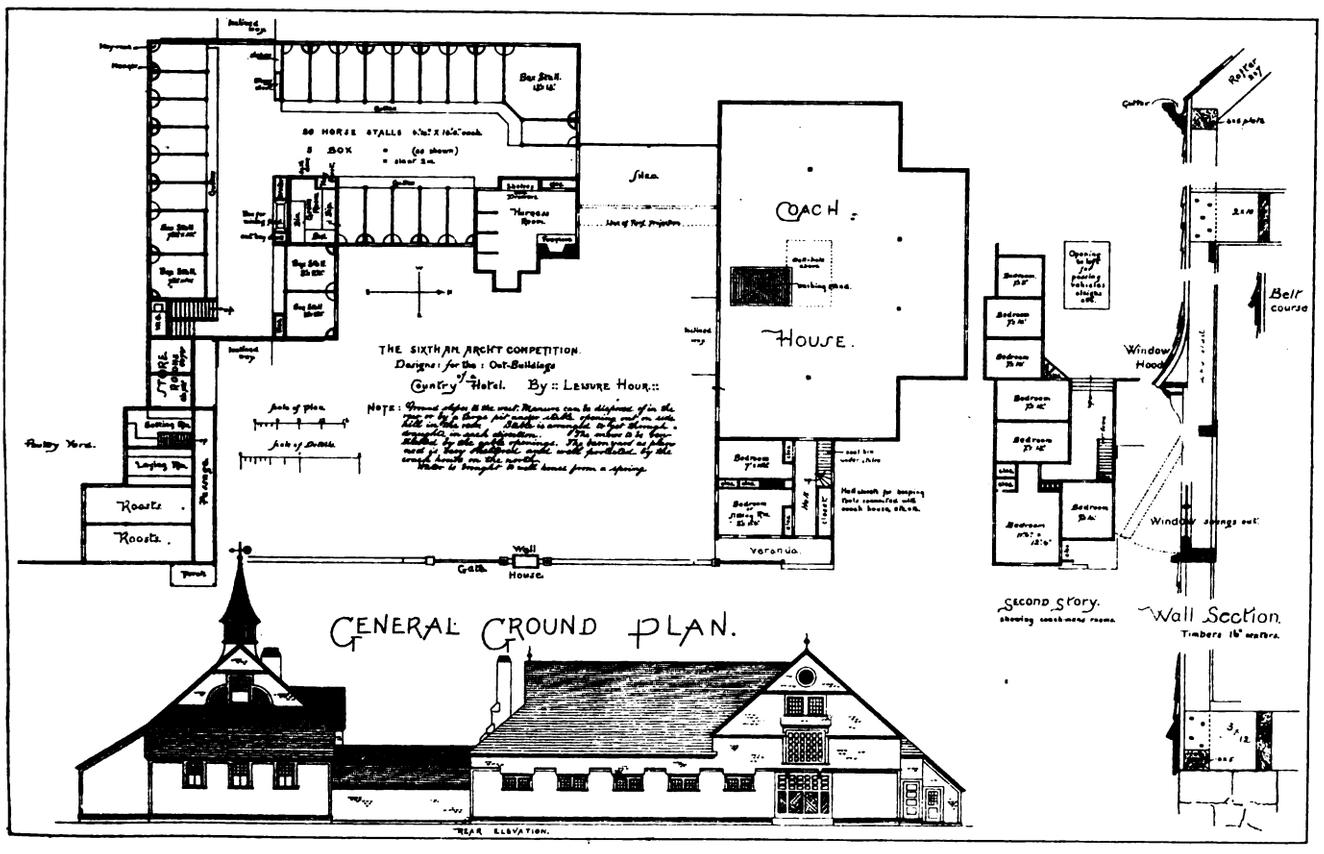

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the inducement which capital and reward are supposed to afford. If Boulle himself were to return we strongly suspect he would have no opportunity to show his power. In the first place he would find it impossible to devote the time to his work that he required two centuries ago to elaborate his creations. Hasty production, with a view to the hasty acquiring of fortunes, — to rival, apparently, other competitors who in their branches have acquired equally hastily gotten gains, — would thwart the best endeavors of the artist who would try to work in the traditions which regulated the industrial productions of the past. Are we calmly to state that what may be called the secondary arts are doomed? Let us hope not; but they are in danger. — *The Builder.*

THE ILLUSTRATIONS.

SKETCHES FROM OLD YORK, BY MR. ROBERT BROWN, BOSTON, MASS.

THESE sketches are reproductions in ink of pencil sketches made in York some years ago. Few cities in England contain in stone so complete a history of Gothic architecture. Each period from early Norman to the last phase of Perpendicular is fully represented. St. Mary's Abbey, the choir of which was begun in A. D. 1271, and the whole building completed within twenty-four years from that date, is a fine example of rich Early English. The tower of St. Mary's Church, Bishophill, Jr., is interesting as being one of the oldest in the kingdom, dating back to the Anglo-Saxon period. Rickman thus describes it: "The upper part has been rebuilt of the old materials. The original masonry is, in parts, of herring-bone work, and has bricks or tiles of the Roman shape built in. The belfry windows are of the usual rude character, with something approaching to long-and-short work in the jambs, a clumsy shaft carrying a long impost, and a plain square dripstone carried on pilaster strips." Some of the old narrow streets of the city are very picturesque, and have been little changed since they were built. The bars or gates in the city wall in addition to their historical interest have in many cases noteworthy features. In color the stone-work is grayish, and such roofs as represented in the last sketch are of red tiles considerably toned down by age. The doorway in Bootham appears to belong to the early part of the twelfth century: how it came to form part of the alms-houses, which are of brick, and probably built during the reign of Elizabeth, I never heard explained.

COMPETITIVE DESIGN FOR A COUNTRY-HOTEL STABLE, BY "*Leisure Hour.*"

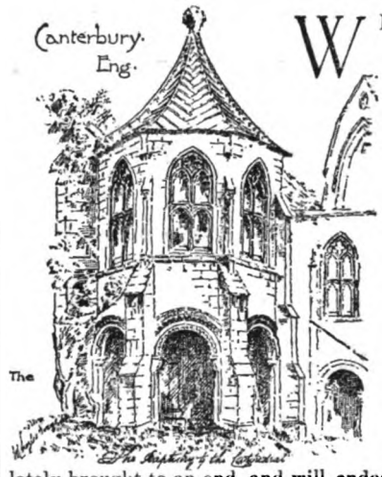
"*Leisure Hour*" also errs in his desire to be picturesque from all points of view and at all costs. The result is a confusion in plan and elevation. This confusion in plan has been largely ameliorated by the wide circulation afforded — at the expense of economy. The stable is airy and well lighted, and the coach-house is vast; its shape, however, is neither the most economical nor most convenient for handling vehicles. It is questionable whether the gate and well-house are judiciously placed so far from communication with the buildings, and there is no doubt whatever that to have to pass the range of poultry-yard dependencies to reach the stable on foot would be objectionable. The perspective is neatly and carefully presented, and certainly offers us an interesting group of buildings in spite of a certain extravagance in varying the motives.

COMPETITIVE DESIGN FOR A COUNTRY-HOTEL STABLE, BY "*Presque mais.*"

"*Presque mais*" knows how to make a most attractive composition, and he has thoroughly caught the spirit of a country barn. The buildings are effectively massed — but at the expense of the plan, which is too compact for all the light and air natural to a country building. "*Presque mais*" does not pretend to give us anything in the way of a court-yard, nor of sheds; but he has somewhat palliated the defects of a great coach-house previously noted, by making his chief entrance directly into it. If time and help are given to provide for previous arrivals and clearing the way, this driving directly under cover is not without merits. From this coach-house the horses can be led — passing the harness-room — into the stable: this communication is easy and direct, and the whole scheme is so simple and economical, and so entirely in the habits of a rural district, that were it not for the lack of sheds to hitch teams which are not unharnessed, we should have given this design a much higher place. The perspective is drawn with delicacy, and is attractively presented. There is an unfortunate error in the perspective of the little gate stile in the foreground.

THE COST OF URBAN LIGHTING. — Leonard Henkle, of Rochester, who conceived the scheme of supplying electric-light from Niagara Falls, has published a tabular statement of the rank, population, number, and cost of public lights, and yearly cost of domestic lights, for the sixty-five principal cities of the country. New Orleans, with a census population of 216,090, has 3,622 gas-lamps, which cost $63,943.20, and 1,574 kerosene lamps, costing $15,779 80; total, $79,723 per year. Cleveland, population 160,146, has 3,729 gas-lamps, costing $71,084 06, and 1,265 kerosene lamps, costing $14,231 25; total, $85,315 31. Pittsburgh, population 156,389, has 1,345 gas-lamps, costing $22,865, and 2,200 kerosene lamps, costing $37,168; total, $60,033. Washington, D. C., population 147,293, has 4,250 gas lamps, costing $106,250. Buffalo, census population 155,134, has 5,253 gas-lamps, costing $148,559.90. Electric-lights have reduced the cost a very little.

THE SAN FRANCISCO CHAPTER, A. I. A.[1]



WHILE I feel sensible of the honor you have done me in electing me President of the first Chapter of the American Institute of Architects established on this coast, and for which I return my sincere thanks, I also feel that the office is no sinecure, and that to properly fulfill the duties of the position might well tax abilities far beyond those to which I can lay claim.

But not to waste words in mere preliminary formalities, I will at once address myself to the task of reviewing the work already accomplished during the past year by the Association lately brought to an end, and will endeavor to sketch out, as briefly as I can, and submit for your consideration, something like a system by which it seems to me our Chapter may be made most useful for the future: first, to the public; second, to the rising generation who are so soon to take our places, and lastly, to ourselves as responsible members of the profession, for I hold that no efforts put forth in the interest of the general good ever fail to redound in most abundant measures to those by whom the effort has been made.

First, then, I submit that during the past twelve months we have made substantial progress in accomplishing the objects for which our Association was formed. As the forerunner of a Chapter, it was necessarily preliminary. The work it had to accomplish was that of preparation and formulation, and, as the event proved, was probably better accomplished in that way than by the formation of a Chapter at that time.

True, our numbers are yet limited: there are more of the profession outside our borders than within; many of those whom we would gladly hail amongst us, and who could most worthily assist us in the objects for which we are associated, still hold aloof from us, and many of those who would themselves be greatly benefited by taking part with us fail to see their way to joining our ranks. Be it our part to conciliate the one class, and encourage and invite the other, to the end that with the association of numbers our influence may increase and extend, and by the harmonious and united action of a powerful body, the truest and highest principles of professional practice may be promoted amongst ourselves, as well as the efficient and faithful observance of those same principles in our respective dealings with the public, and which, after all, can alone justify our corporate existence.

During the year six of our number have been elected Fellows of the American Institute of Architects, and together with our late President constitute a fellowship of seven. We have lately formed a Chapter in connection with the above body, the first on the coast, to be followed, let us hope, by many others, as State after State develops and progresses in science and art under the fostering influences of prosperity, civilization, and refinement.

During the year, also, an experiment has been made which demands more than passing notice, and which I mean to make the text for the remarks which follow.

I allude to the successful inauguration of a system of competitions amongst the architectural students of the city and vicinity. True, this was of a very limited character and participated in by but few; but the designs received evinced a degree of merit hardly to be hoped for in a first trial, and certainly worthy not only of commendation, but systematic development and encouragement.

The theory and practice of art, united in the person of the master builder of old, produced works which succeeding ages may hope perhaps to emulate, but never to excel, unless, indeed, by a return, not to the conditions of the past—for that is impossible—but to the practice of similar principles and methods, though worked out in a different way. In modern times the office of designer and builder have been divorced, with consequences exceedingly detrimental to each. The former is no longer, as in ancient times, charged with execution of his own designs. His knowledge and experience is therefore likely to lessen as regards the adaptation of materials to special or general purposes, and to become more or less superficial; while the builder, no longer responsible for the artistic quality of the design which he executes, has less and less scope as well as encouragement for the development of knowledge, taste, and skill in the execution of his work. How utterly wrong is all this, and how impossible for either the one or the other to succeed in producing a satisfactory result! Again, while the arts of printing and photography have been instrumental in rendering all who desire it familiar with almost every architectural structure of any note in the civilized world, there has been developed an excessive tendency nowadays to adopt the forms of art, without regard to the materials in which they are to be embodied, together with an indiscriminate selection

[1] Address delivered before the San Francisco Chapter of the American Institute of Architects, by the President, John Wright, Esq.

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of details of every age and style, without regard to the simple principles involved in their origin, growth, and development.

Speaking professionally, the greatest need of the present day is, first, true taste and accurate knowledge of art in the designer, united with a thorough knowledge of materials and their proper adaptation to truthful construction; second, a public whose educated tastes will detect and condemn every subterfuge, and whose sense of the *ideal* will be satisfied only by the *real;* third, a system of professional instruction for our students or young designers which shall educate teachers as well as taught, and which in effect shall be practical, sufficient, and sure, and which shall embrace not only the highest but the lowest level of the art.

Assuming these three propositions to be granted: with regard to the first, I would suggest that at every regular meeting of the Chapter papers should be read on the exceedingly varied and instructive topics with which the general theme of architecture so greatly abounds.

We live in an age of vast development of the material sciences, and the importance of their judicious application and economical adaptation to the endlessly varying wants of constructive design furnishes a never-failing source from which to draw for a subject.

The best methods of construction, past and present, with such suggestions of still greater improvements as may from time to time occur. The question of interest surrounding the subject of *plan*, with its developments, historical and national. The great question of a universal style, parallel to that still greater problem, that of a universal language to which it bears a large analogy. The development of a truthful treatment of material in construction, before alluded to, and an equally important matter, the adoption of the most substantial of materials, though attended, it may be, with a sacrifice of mere meretricious ornament which possesses in itself neither use, beauty, nor meaning. Then the question of ornament itself, and its proper treatment in harmony with the material in which it is to be executed. All these, together with many others too numerous here to particularize, might be taken up as specialties by different members of the Chapter, and pursued systematically; and, if followed by discussions and criticisms, would doubtlessly prove eminently beneficial to all concerned.

For the general public, who are apt to imagine that on matters architectural their knowledge is complete, periodical lectures would probably be of great use in arousing interest in the many subjects in which the public have so much at stake, as well as establishing in their minds true principles of taste, and a just and critical judgment as to what constitutes true beauty in architectural design.

Thirdly, and most important of all, the students.

It is evident that unless our young men are gradually prepared by intelligent training to take our places in the professional ranks, that either those ranks will be replenished by raw recruits unfitted for the work they have to do, or that foreign talent, of which there is so great an abundance ever pressing at our doors, will step in and supply the public need in designing our dwellings and public buildings, thereby fixing upon us the national peculiarities of style to which its representatives are respectively most attached — generally at variance with the prevailing characteristics of our national taste, and ill-adapted to our climatic requirements. At the best, we shall possess but a feeble and soulless jumble, ever varying with the latest importation of professional taste.

How much better that our young men should be thoroughly furnished through careful study and assiduous training, by the best and most practical methods within our and their reach; so that they may themselves supply the public demand, and by harmony of effort and unity of thought strive to found and establish on this Pacific Coast a school of our own, which shall be free from the inherent defects which a variety of foreign styles and methods of building are sure in some degree to possess. To this end, I beg to make the following propositions, to be followed by such action in the premises as in your good judgment may be deemed best.

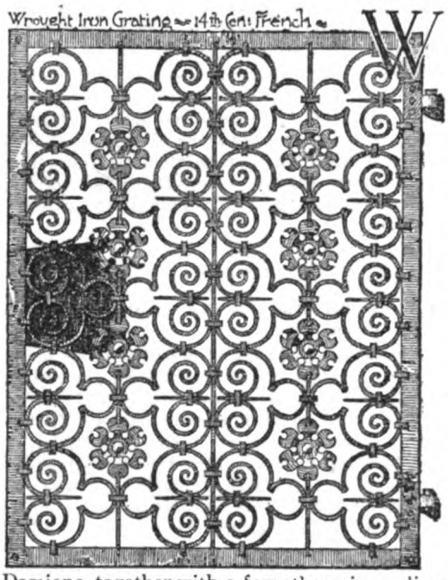
First. To establish a free class for architectural students belonging to the Chapter, the class to be instructed by members of the Institute who shall take up such special branches of study as they may consider themselves best fitted to impart, and who shall give their services free of charge.

Second. That the system of study and reading, which may be arranged in harmony with the above, be supplemented by periodical competitions among articled students.

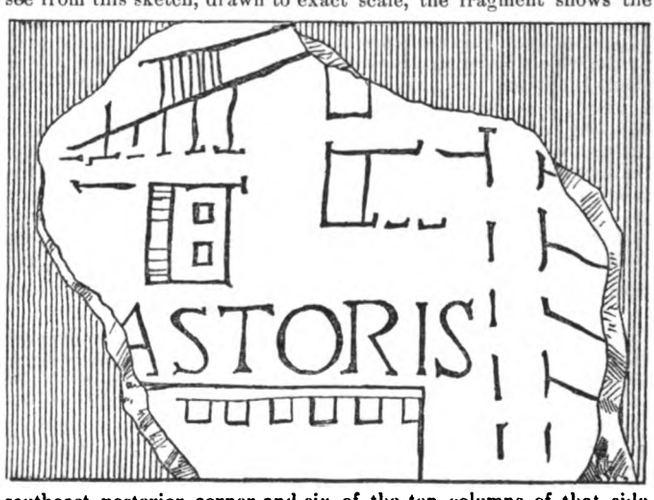
Third. That at the end of three years, a six months' travelling studentship, providing for a tour in the Eastern States and Europe, be established; the privilege of which shall be given to the student obtaining the prize in a competition to be held at that time; the expenses of said student not to exceed say six hundred dollars, and to be paid out of a fund created by the fees of life members. Such fees to be invested as a nucleus of a fund to be kept sacred for the above purpose. In case the interest of said fund be found insufficient for the purpose, the balance to be paid by the Chapter.

The result of some such course would be a systematic study of styles and modes of construction, historical and national, from the best models and under the best available tuition, thus rendering the student familiar with the development of the art from the earliest times. Also the comparative study of real buildings as a final preparation for the chosen work of his life, the success of which would be almost assured by such a conclusion of his arduous study. And lastly, the placing of a sufficient inducement before the student to lead him to devote himself with earnestness to the work before him.

THE MARBLE PLAN OF ROME.



WORKMEN busy in excavating a little to the east of the remains of the Temple of Vesta, on April 12 last, writes the correspondent of the London *Times*, discovered one of the many missing fragments of the celebrated marble plan of Rome, which is believed to have been drawn in the time of Septimius Severus and Caracalla, whose names it bears, and which is known as the Pianta Capitolina, from the circumstance that the portions of it found in the time of Paul III, behind the Basilica of Saints Cosma and Damiano, together with a few other pieces discovered in the same locality in 1867, are framed in panels on the staircase walls of the Capitoline Museum. Strangely enough, the fragment recently discovered refers to the locality where it was found, but unfortunately it was necessary to suspend the excavations on the Forum side at the very edge of that small area delineated upon it which extends under the modern roadway thirty-five feet above, and where the little church of Santa Maria Liberatrice stands. The excavations have, indeed, been recommenced on the Palatine side of the roadway, and will finally be connected with those on the Forum; but, as even a few weeks' work may effect many interesting revelations, it will not be until the very last, when the roadway and the church are removed, that archæologists can hope to see the verification of what is drawn on this precious bit of marble. In the meantime, while conveying some perfectly clear information, it affords material for conjecture as apart from that mere controversy into which scientific archæologists are now but little inclined to enter. As you will see from this sketch, drawn to exact scale, the fragment shows the



southeast posterior corner and six of the ten columns of that side of the Temple of Castor with the name inscribed along it,— the C and half of the A being wanting,— and it nearly completes the piece on the Capitoline staircase, which gives the front and west side of the temple, with a portion of the Basilica Julia next to it, and the Vicus Tuscus passing between them. This newly-found fragment shows no indications of a road on the east of the temple. It stands, both as regards that side and its end, on the open area of that extremity of the Forum, on which are other constructions and indications not designated by name. At a short distance behind the temple — and I may remind you here that this ancient plan is drawn on an average scale of one to about two hundred and fifty — there runs a street with tabernæ opening upon it and facing towards the back of the temple and the area it stands upon. This street, Signor Marucchi says, in a communication made by him on the subject to the Pontifical Academy of Archæology, "corresponds very well with the position of the Via Nova, which commenced at the Valabrum, touched the Forum behind the Temple of Vesta, and went up the Palatine," and this opinion is also entertained by Signor Lanciani, the director of the excavations. The lines on the left indicate an ascent formed by steps and long landing-places, with constructions which may have been small tabernæ, or scribes' offices, built against its east side leading up in the direction of the northwest corner of the Palatine where the summit of such an ascent, with alternate flights of steps

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and levels, constructed of thick masses of travertine, was discovered by Signor Rosa when excavating some twenty years ago at that spot. That the lines on the plan indicate the foot of that ascent is accepted by all. It would intersect the Via Nova, which at the point of crossing would form one of the levels. To this ascent Signor Lanciani, on a phototype of this fragment placed together with that on the Capitoline staircase, which is to be appended to his official report, and of which I have seen a proof impression, puts the name "gradus in Novâ Viâ." Of such ascents, called in Italian *cordonate*, intersecting public streets, there are several examples in modern Rome. Between this and the side of the Temple of Castor there is a rectangular construction, with two lateral flights of steps, which Signor Marucchi, from its vicinity to the Temple of Vesta, of which we should have seen at least part of the plan had this fragment been a little larger, thinks may possibly be the Atreum Vestæ. What the other construction between this and the Via Nova may have been cannot as yet be surmised. It is exactly above these that the church of Santa Maria Liberatrice stands. In front of it passes the modern road and the bank of accumulation, which, extending downwards and outwards from it, buttress fashion, reaches and just covers the spot where the square construction with the two lateral flights of steps is indicated. The third, fourth and fifth columns of the Temple of Castor, counting from the end, are the three still *in situ*.

The ancient marble plan of Rome, of which this fragment formed part, was, it is now sufficiently well known, originally situated on the exterior of a large brick wall forming the posterior portion of the group of — what have hitherto been regarded as three — edifices, one circular and two rectangular, converted by Pope Felix IV, A. D. 526, into a Basilica devoted to Saints Cosma and Damiano; and it is an interesting coincidence that almost simultaneously with the discovery of this fragment of the plan, Signor Lanciani has succeeded in completely solving the mystery that has shrouded until now the two posterior edifices and, until recently, all three of these "temples," as they have been called, standing in a block together; and at the same time he has demonstrated why this marble plan was graven and placed on the wall at the foot of which its remains were found. The circular building facing on the Sacra Via, and called as lately as 1867 the Temple of Remus, was in that year, on the conclusive evidence of drawings by Pirro Ligorio, with annotations by Pauvinius, found in the Vatican library by that learned student of Christian archæology the Commendatore G. B. de Rossi, proved to be the temple dedicated to Romulus, the son of Maxentius; but he could obtain no information regarding the two in its rear beyond the fact that Pauvinius mentions the furthermost as *Templum Urbis Romæ*, without giving any explanation as to what this *Templum Urbis* might be or when or by whom it was dedicated. There were many other plans, drawings, and sketches in Codex 3,439, besides those of which De Rossi made such good use, but there was nothing to show what edifices they referred to, and, moreover, it has since been ascertained that they were so misplaced when they were bound together in the time of Clement X as to render them incomprehensible to even the most acute students who were not possessed also of a sound practical knowledge of architecture. In the course, however, of a very close study which Signor Lanciani — with the view to obtaining all the light possible to assist him in the excavations he is directing — has made, not only of the drawings in the Vatican Codices, whether by Pirro Ligorio or others, but also of those in the Barberini and the Florence libraries, and especially of the collection of Ligorio's drawings in the Bodleian Library at Oxford, he has discovered, among much other valuable and available information, a plan among the Bodleian drawings. This, on comparison with another plan and a sectional elevation in Codex 3,439, proved beyond a doubt — the one throwing light on the others — that all three referred to the ancient edifices Felix IV converted into the body of the Basilica of Saints Cosma and Damiano, for which he utilized the Temple of Romulus as the vestibule. From the information afforded by these drawings, by the excavations recently made down to the ancient level on the east side of the basilica, by historical records, and by inscriptions existing, all taken together, Signor Lanciani has now established with certainty that the supposed two temples built square against each other like a pair of semi-detached houses are in fact but one edifice, much disguised by restorations and alterations, originally the library mentioned by Aulus Gellius and by Trebellius Pollione as having been built by Vespasian on his Forum Pacis. But, it is asked, what could have been the reasons which induced Septimius Severus and Caracalla to affix their marble plan to the wall of a library, and that not one of the most celebrated in the city. All writers are agreed that that plan was placed there not by chance, but because it had an intimate connection with the use, purpose, and name of the edifice upon which it was displayed. That edifice could therefore be no other than what one may call the Imperial surveyor's record office for the preservation of the plans and details of plans, specifications, descriptions, and records connected with those extensive works carried out by Vespasian, which involved an entire revision of the plan of the city and almost the rebuilding of it. "When he took the reins of empire after the Neronian and Vitellian catastrophes Rome was still '*deformis veteribus incendis atque ruinis*'" (Suetonius, Vesp. 8). The city was in a state of both material and administrative disorganization. It was found necessary to survey and define the limits of those areas which were public property, for private persons had usurped possession in many places; to finish, catalogue, and measure the new streets laid out by Nero, and to force owners to rebuild or yield the space to others willing to do so. To all these public works of rebuilding, restoration, and reorganization must be added those initiated by Vespasian, his Temple and Forum of Peace, the Colosseum, and others; and in the same way in which the *forma Urbis* of Agrippa and Augustus, defined in the year 746 of the city and solemnly sanctioned in the Calends *Augustis* of the year following, was in all probability publicly exhibited in the portico of Vipsania Polla, nothing is more likely than that Vespasian displayed the plan of the new Nero-Vespasian city in his Forum of Peace and on the wall of that Public Works office built on it, where, as in a library, the important documents, records, and plans connected with the new city were placed. This, which was in substance conjectured and sustained on valid arguments by Jordan and by De Rossi some time ago, must now be considered as definitely established through the researches and discoveries Lanciani has made in the libraries *pari passu* with the work of the pick and the shovel. In A. D. 191 there befell the great fire in the reign of Commodus. It burst out so suddenly and with such destructive violence that it was not even possible to save the more precious among the masterpieces of art in the Temple and Forum of Peace. In such circumstances the Public Works archives in the library must have perished also, and hence the necessity for the immediate replacing of the documents required by a department which was indispensable to the city government of the capital of the world; for the engraving of a new plan, of which comparatively only a few valuable fragments now remain to us; and for those restorations in the much injured walls of the building which have led to the supposition that it was two separate edifices. Moreover, the period between the accession of Septimius Severus, A. D. 193, and the year 211, when this, as we must suppose, second marble plan was finished, was one of the most brilliant in the architectural history of the city.

The number of edifices built and restored by Severus and Caracalla was so great that it is difficult to understand how it was possible for those two emperors to have accomplished so much. Spartianus says, "Romæ omnes ædes publicas quæ vitio temporum labebantur instauravit, nusquam prope suo nomine adscripto, servatis tamen ubique, titulis conditorum;" and it is easy to understand that Severus and Caracalla must have felt a personal satisfaction in hastening the completion of the plan, which was to record also the grand works of restoration they had accomplished, and the splendid edifices with which they had additionally embellished the city, which now for the first time was called *Urbs sacra Augustorum Nostrorum*. What the official denomination of this building may have been Signor Lanciani does not undertake to determine; but, while it could not have been a temple in the architectonic sense of the word, he agrees with Jordan and De Rossi in conjecturing that, as a place *augurio consecratum*, it was called the *Templum sacræ Urbis*, from, that is, the time of Severus. As originally constructed by Vespasian, it was built of squared blocks of stone, *opus quadratum*, faced with marble; and Ligorio's plans show that its façade, which fronted the north-east, was adorned with a colonnade; that the plan was placed on the north side wall; and that there was also a doorway at the back — *i. e.*, that which has recently been cleared from the accumulation lying before it.

The injury caused by the fire of 191 was so great that it was necessary to rebuild the wall on which the plan was situated, and half of that which, of the Basilica of Saints Cosma and Damiano, is the side wall facing the east, but was the back wall of the edifice itself. This was done by Severus in brickwork: hence — taken together with the internal division thrown across at about that point by Felix IV in forming the apse of his Basilica — the reason why this edifice was supposed to be two built flat up against each other. The Ligorian drawings show, however, that there were considerable remains of the original construction of *opus quadratum* visible in his day in the lower part of that portion of the back wall rebuilt by Severus in brick. An interesting front view, drawn by Du Perac, of the Basilica of Saints Cosma and Damiano, standing in a deep hollow caused by the ruins buried in accumulation piled up around it, before Urban VIII, in 1632, took down the ancient doorway, and raising the floor of the building some twenty feet placed it on a higher level, shows distinctly the *opus quadratum* stone-work then still existing of the corners of that end of what was supposed to be the brick building where it is in immediate contact with the round mole of the Temple of Romulus. There is documentary evidence to show that this stone-work was removed by Urban VIII when he altered the level of the floor of the Basilica, and was utilized in the building of the Church of St. Ignatius, and that concessions for removing the stone-work from the Basilica were granted in 1461, 1462, and 1583; but for these and for the great weight of evidence Signor Lanciani adduces in proof of his discovery I must refer archæologists to his exhaustive paper on the subject in the January-March number of the *Bullettino* of the Municipal Commission of Archæology, contenting myself with this brief sketch, culled from it, of the important result he has obtained.

I may mention that in order to make the annexed copy of the fragment of the marble plan as large as possible, I have placed the extreme point on the left and the ragged edge on the right beyond the margins.

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PREPARING DRAWINGS FOR A SUB-CONTRACTOR.

July 13, 1882.

To the Editors of the American Architect: —

Dear Sirs, — Will you kindly answer the following question through the columns of your paper? Is it proper for an architect to charge a sub-contractor a proper sum for a duplicate set of plans, made at the sub-contractor's request, the architect having already furnished a complete set for the *general contractor* who has contracted for the whole work? By giving your opinion on the above you will oblige very much. Subscriber.

[It is not generally wise for the architect to take pay from a contractor or sub-contractor for drawings or anything else. We know that it is not unusual for sub-contractors to ask for a set of plans for their own convenience, and as the architect is certainly not bound to furnish them for nothing, an arrangement by which he allows his office-boys to trace them, and charges the bare cost, is frequently and innocently made, out of pure willingness on the architect's part to accommodate the contractors, and thus indirectly his client. Nevertheless, we have known offers of disproportionate remuneration to be made by designing contractors for such service, and although we are glad to say that we have never known them to be accepted, any such relations between architects and contractors are objectionable. The party who should really pay for extra drawings is the client. If the architect thinks that the furnishing of a second set of tracings would forward his employer's business, he ought to be at liberty to make them at his discretion, and charge them to the person so benefitted; and we think that this is a recognized custom in France, and to some extent in England. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Number of Visitors to South Kensington Museum. — On the 22d of June, 1882, was completed twenty-five years since the Museum was opened. The number of visitors during the time has been 21,077,654 — morning, 14,676,155; evening, after 6 P. M., 6,401,499; total, 21,077,654.

Asphalt used in the Preservation of Wood. — The increasing cost of wood in this country has led to a great number of experiments in preserving from decay all kinds of wooden structures exposed to the weather. Among the more recent plans suggested is one for impregnating wood with asphalt, combined with some antiseptic material. The finished wood, ready to be put together, is first submitted to heat to drive out the moisture, and is then placed in a hot bath composed chiefly of asphalt and carbolic acid. On cooling, the solvent of the asphalt evaporates, leaving a skin or coating of the asphalt on the surface of the wood that resists water and keeps the antiseptic material securely locked within the pores of the wood. The exterior of the wood presents a smooth, black surface that does not need to be painted. — *Iron Age.*

One Method of Cistern-Building. — The following directions for the construction of a cistern appears in one of our exchanges, and is likely to be of interest to our readers. The directions are given in answer to a question from a correspondent, who is advised to dig his cisterns through the solid ground; leaving the walls smooth. They are then to be plastered with good mortar, composed of cement and sand. If brick be used, the roots of trees penetrate the interstices and crack the plaster on the inside of the cistern, and of course cause it to leak. Test the mortar before using by moulding a brick of it, let it dry, and if it is as hard as a stone it is of the proper consistency. If dried in the shade, or sprinkled occasionally to prevent drying too rapidly, it will not crack. If there is no plastering to be done in the process of digging, I would suggest, if the cistern is in the yard, that the shelter be first constructed, to prevent interruption from rain. The only brick that ought to be used are what are required to form the arch, which must be commenced by an abutment cut around the circumference of the cistern. The arch should be as flat as is consistent with strength. An orifice about three feet in diameter should be left in the centre, and the neck should be built up about two and a half feet and neatly covered, and a chain pump erected thereon. I say chain pump because it keeps the water agitated and prevents stagnation. Let the water run through a reservoir filled with charcoal and sand. Cistern water for drinking purposes is best caught in winter. Cisterns are almost universal in the cotton States. One may be constructed at the barn to water the work horses, in the garden to refresh the plants in time of drought, and in or near the kitchen; but have no hole for the entrance of rats or snakes, or any kind of insects, and the water will be pure and good.

"Mysterious" Boiler Explosions. — The *Locomotive* recently received a communication from a well-known dealer in machinery, giving a striking illustration of the usual causes of many of our so-called "mysterious" boiler explosions. The gentleman says: A gentleman applied to us for a "cheap boiler," one that "would be good for two pounds or so." The only one we had had just been tested at 150 pounds to the square inch, but that was "too good." He said he once bought one for $30, and ordered a young man in his employ to get up steam in it. He went away and was gone longer than he expected, and on his return he found a raging fire in the furnace, a pot filled with bricks on the safety-valve lever, and a very much frightened young man hanging on to the same lever with all his weight and both hands. The boy said, in explanation, that he didn't know anything about a boiler, but he supposed that if he "let any steam get out of that thing on top it would blow him and the shop to smithereens." "Ah!" said he, "I'm glad ye came, for I couldn't howld it much longer." It evidently came very near being another "mysterious" explosion.

Systems of Fortification. — Many systems of fortification have been invented by different engineers. The principal ones are Vauban's first, second and third systems; the French modern system, Cormontaigne's, Carnot, Coehoorn, Montalembert's, and the German system. Theoretically, the works of defence are assumed to be built upon a level plain, but in practice it is the duty of the Royal Engineers to arrange their fortresses so as to adapt them to the defence of the position they are intended to protect. Vauban uses bastions about four hundred yards apart, encircled by ditches and a path called a "covered way," where the sentries are posted, the whole being screened by a sloping bank of earth called a glacis. He invented ricochet fire — that is, the destructive art of firing shot or shell into the forts so as to strike inside, and then bound along, destroying all in their path. The French modern system is merely an improvement on Vauban's, effected by having large ravelins or projecting works pushing themselves forward upon the position it is intended to protect; and Cormontaigne made some modifications on both systems. The main principles of Carnot, a distinguished French engineer officer, were to fire perpetually from mortars at his enemy, and encircle his town with thick masonry walls, pierced with loopholes and protected, by being in the ditch, from distant fire. Coehoorn, a Dutch engineer, flourished in the seventeenth century and invented a small mortar, long used in the British service for throwing small shot and shell; but the great credit attached to his name is due to his discovery that situations having aquatic sites must be defended on different principles from those on dry ones. He defends his town by placing a dry ditch within a wet one, and the fortresses of Breda, Namur, and Bergen-op-Zoom are good examples of his system. Montalembert advocated a system of masonry for protecting his cannon, and he armed his fortresses with such a number of guns that their heavy concentrated fire would effectually keep a besieger at a distance. Some of his ideas have been utilized in the fortification of Coblenz. The German system has been much used on the continent. Forts Alexander, Kaiser Franz near Coblenz, Rastadt, Antwerp, Wesel, and Erfurt are fair examples, and its principles have been adopted in many of the new works in the United kingdom. Its conspicuous features are the enclosing of a given space by the shortest possible line of works; the placing of isolated defensible works in prominent situations, defending the ditch by powerful detached towers called *caponnières;* placing casemented barracks, heavily armed, in the vital points of the position, and making free use of mining some portions of the ground round the fortress, so that if an enemy attempted to establish himself too near he could readily be blown up. The system has the advantage that a small force can defend it, and the works, being concentrated, are well under the supervision of the commander. — *Chambers's Journal.*

Expansion and Contraction of Iron. — Sir Edmund Beckett, in a letter to the *English Mechanic and World of Science*, mentions a very curious fact — if it be a fact — in connection with the late Mr. Scott Russell's great iron cone or "dome" of the Vienna Exhibition, which is 360′ wide, and therefore covers six and a half times as much ground as the domes of the Pantheon, St. Peter's, or Florence Cathedral, and three times as much as the Albert Hall (185′ x 220′). The gentleman who was Mr. Scott Russell's resident assistant in building it told Sir Edmund Beckett that they were at first uneasy about the expansion and contraction being likely to keep the pillars on which it stands continually leaning outwards and inwards to a serious extent; for according to the tabular expansion of iron, it would vary half an inch in a radius of 180′ between many days and nights, and an inch between summer and winter, but that Scott Russell came to the conclusion that it would not, and that they did find no motion at all in the pillars, and further that it had been found by experience that the rollers which were carefully provided for all the earlier tubular bridges to expand and contract upon never act at all, and that other such bridges do as well without any. Sir Edward Beckett confesses all this sounded to him surprising, and still is so, and probably it will be to most people; but it is never of any use to disbelieve experience for theories, if it is certain. The result is so important to all who have to do with iron beams and rods in holding buildings together, that it is very desirable that we should know how the fact really is, and then (but not before) to investigate some satisfactory theory about it. Railway engineers must know by this time whether it is necessary to allow any play in the fish-joints of rails, or between the ends of the rails if laid down in cold weather, though, to be sure, the length of a rail is quite insignificant compared with the width of the Vienna dome or the Menai bridge.

Church-Building Societies in England. — The "Incorporated Church Building Society" of the Church of England is one of many societies all engaged in the same work. Its income last year was about $60,000, but the report shows that its achievements have been out of all proportion to the slenderness of its means. It has built, as *The Churchman* points out, or encouraged the building of, thirty-one new churches, and has assisted the rebuilding of nine. "It has also made grants for enlarging or increasing the accommodations in sixty-seven others. This in one year. But the £12,000 that passed through its treasury was only the nucleus of this crystallization. Since 1818 the society has received and disbursed something less than £900,000; but it has stimulated the public to an expenditure of something more than £11,000,000. It takes credit, therefore, for the erection of 1,893 new churches and chapels, for the improvement of 5,224 old edifices, and for the provision of 1,027,870 additional sittings. The society includes within the sphere of its operations all England and Wales. Wherever it discovers a remote corner in which a mission-chapel is needed, it builds that chapel or helps to build it. There are several English church-building societies which have a common ancestry in "The Bishop of London's Fund." When, some years ago, East London was cut off from the diocese of London and given to Rochester, "The Bishop of Rochester's Fund" took up the good work and carried it on. Then came the new Diocese of St. Albans, and a "Bishop of St. Alban's Fund" — and now in North London there is a "Bishop of Bedford" and a "Bishop of Bedford's Fund." These funds, in their several districts, are engaged in a common work. They promote the building of churches; they provide incomes for the maintenance of more clergy; they found or keep up church schools The Church of England is awake and alive again, as if from the dead. Church extension is in active progress in every direction.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

260,359. RATCHET-DRILL. — Charles E. Billings, Hartford, Conn.

260,361. LOCK-HINGE. — John L. Bixby, Arlington, Mass.

260,362. BORING-MACHINE. — Christopher D. Blevens, Richmond, Ky.

260,371. STATIONARY WASH-STAND. — Patrick Connolly, Brooklyn, N. Y.

260,395. CUTTING-PLIERS. — Timothy D. Hotchkiss, Higganum, Conn.

260,396. VISE. — Edgar O. Hunt, Melrose, Mass.

260,401. TUBE-WELL. — Ambrose N. Lane, Rochester, N. Y.

260,404. HAND VISE AND WRENCH. — Peter S. Meabon, Frankfort, Mich.

260,413. COMBINED BLOWER AND DAMPER FOR GRATES. — George W. Ranson, Richwood, Ky.

260,422. FIRE-ESCAPE. — Andreas Röhmer, Foster's Crossing, O.

260,424. MACHINE FOR ORNAMENTING STONE. — David Shortsleeve, Rutland, Vt.

260,437. HINGE. — Henry A. Wilbur, Cambridge, Mass.

260,479. WRENCH. — Edward P. Hand, Newark, N. J.

260,497. AUGER. — William L. Parmelee, Ansonia, Conn.

260,511. MANUFACTURE OF ARTIFICIAL STONE AND MARBLE. — John W. Watts, Baltimore, Md.

260,533. APPARATUS FOR FORMING UNDERGROUND DRAINS, ETC., IN CEMENT. — William M. Campbell, Mount Clemens, Mich.

260,546. MANUFACTURE OF HYDRAULIC LIME AND HYDRAULIC CEMENT. — Edward J. De Smedt, Washington, D. C.

260,559. ARTIFICIAL STAINED GLASS. — Jonathan O. Fowler, Jr., New York, N. Y.

260,563. SEWER-TRAP. — Henry B. Greenleaf, Boston, Mass.

260,564. CHIMNEY-VENTILATOR. — Hermann Hahn, Schönberg, Mecklenburg-Strelitz, Germany.

260,602. WATER-CLOSET PAN. — Sidney R. Onstead, Brooklyn, N. Y.

260,609. MONKEY-WRENCH. — Charles Richards, Cleveland, O.

260,622. BLIND-SLAT ADJUSTER. — Geo. W. Springsted, New York, N. Y.

260,627. FIRE-ESCAPE. — Joseph H. Townsend and Edward A. Dubey, Brooklyn, N. Y.

260,639–641. FIRE-EXTINGUISHER. — John W. Bishop, New Haven, Conn.

260,649. SHUTTER-FASTENER AND ALARM. — Isaac Brooke, Royer's Ford, Pa.

260,666. PLUMBER'S TRAP. — Patrick Connolly, Brooklyn, N. Y.

260,675. AUTOMATIC HATCHWAY-DOOR. — Edward M. Hackett, New York, N. Y.

260,691. LATCH. — Frederick J. Lee, Oswego, Kan.

260,722. FIRE-ESCAPE. — Charles P. Willson, Summit Point, W. Va.

SUMMARY OF THE WEEK.

Baltimore.

IMPROVEMENT.—Addition and new front to house, No. 535 W. Baltimore St.; cost, $2,500; Mr. Wm. F. Weber, Architect.

BUILDING PERMITS. — Since our last report twenty-seven permits have been granted, of which the more important are as follows: —

S. A. Marchand, 4 three-st'y brick buildings, Fairmount Ave., between Castle and Washington Sts.

Mrs. A. Schimp, two-st'y brick building, Mount St., n of Patterson Ave.

National Exchange Bank, five-st'y brick building, with basement and sub-cellar, on Sharp, Liberty and German Sts.

Richard Courtney, one-st'y brick building and two-st'y brick stable, in rear of s e cor. Charles St. and North Ave.

Philip Sadtler, 2 three-st'y brick buildings, s e cor. Little Clay and Eutaw Sts.

Wm. Martin, 2 three-st'y brick buildings, Saratoga St., e of Stricker St.

Mrs. James McCurley, three-st'y brick building, s e cor. Liberty and Lexington Sts.

Archibald Teal, 3 two-st'y brick buildings, Madeira Alley, between Pratt and Gough Sts.

Archibald Teal, 3 three-st'y brick buildings, Patterson Park Ave., n of Gough St.

Adam Sultan, two st'y brick building, Washington St., between Fayette and Orleans Sts.

E. T. Codd, one-st'y brick building, in rear of s w cor. Caroline and Aliceanna Sts.

Wm. E. Whitson, 2 three-st'y brick buildings, Paca St., between Columbia Ave. and the Bend.

E. W. Haviland, 2 two-st'y brick buildings, Liberty Road, between Stricker and Gilmor Sts.

Chas. H. Mickelman, 3 two-st'y brick buildings, Burke St., n of Aliceanna St.

Henry Westfall, 2 two-st'y brick buildings, on alley in rear of Byrd St., bet. Barney and Heath Sts.

Elizabeth Harwood, three-st'y brick store and dwell., Franklin St., bet. Paca and Jasper Sts.

Ann G. Hellwing, three-st'y brick building, Eastern Ave., bet. Ann and Regester Sts.

Ludwig Humirichausen, 6 two-st'y brick buildings, Clement St., e of Johnson St.

George Humirichausen, two-st'y brick building, Clement St., e of Johnson St.

Jacob Seeger, 3 three-st'y brick buildings, Frederick Ave., bet. Calverton Road and Brown's Lane.

Barney Kirwin, three-st'y and mansard roof brick building, Mosher St., in rear of s w cor. Linden Ave. and Mosher St.

Emory M. E. Church, three-st'y brick building, Pa. Ave., bet. Dolphin and Hoffman Sts.

John R. Mitchell, one-st'y brick building, 15′ x 60′, Washington St., s of Aliceanna St.

Henry McCaffray, three-st'y brick warehouse, Lexington St., bet. Park and Liberty Sts.

Boston.

BUILDING PERMITS. — *Wood.— Centre St.*, rear No. 6, Ward 21, for Moses H. Libby, 2 two-st'y dwells., 17′ x 34′; W. A. Low & Son, builders.

East Second St., Nos. 649-651, Ward 14, for Annie Sullivan, three-st'y dwell. and store, 21′ x 30′; John Nevens, builder.

Ashley Ave., near Breed St., for Margaret A. McLean, dwell., 18′ x 25′; A. & J. McLaren, builders.

Orient Heights, for Margaret A. McLean, dwell., 18′ x 25′; A. & J. McLaren, builders.

M St., near East Seventh St., Ward 14, Wm. T. Eaton, three-st'y mansard dwell., 20′ x 30′; Wm. T. Eaton, builder.

Leonard St., near Crayton St., Ward 14, 3 two-st'y dwells., 24′ x 34′, for J. W. Hoxie; Wm. T. Eaton, builder.

Orange St., near Central Ave., Ward 23, for Cornelius J. Van Hondt, dwell., 18′ x 25′; Mr. Crosby, builder.

Chestnut St., No. 10, Ward 5, for Francis Raynes, three-st'y dwell., 26′ x 23′ and 29′.

Brick.— East First St., opposite N St., Ward 14, for City of Boston, two-st'y dwell., 33′ 10″ and 39′ 6″ x 45′ 6″; Dady & Flint, builders.

House of Correction Grounds, for City of Boston, two-st'y dwell., 33′ 10″ and 39′ 6″ x 45′ 6″; Dady & Flint, builders.

Summer St., Nos. 64-68, Ward 2, for Samuel Goldenberg, three-st'y tenement, 40′ x 60′; Fessenden & Libby, builders.

Marginal St., rear of, next B. R. R. & L. R. R., for Conrad Decher, storehouse, 25′ x 40′ and 16′ x 40′; Frame & Patten, builders.

O St., rear of No. 121, Ward 14, for Wm. G. Doe, 2 three-st'y dwells., 20′ x 30′; J. H. Wigglesworth, builder.

Savin St., near Blue Hill Ave., Ward 21, for Gustavus Johnson, two-st'y dwell., 35′ x 30′; H. J. Bartlett, builder.

Locust St., rear of No. 5, Ward 15, for Alpheus A. Fleming, stable, 16′ x 16′; G. Merz, builder.

Howard St., rear of, near School St., Ward 24, for Walter L. Dennis, stable, 22′ x 35′.

Amory St., opposite Codman Ave., Ward 23, for Charles B. Wilston, two-st'y dwell., 20′ and 24′ x 32′; Wm. Morse, builder.

Mosely Ave., rear No. 23, Ward 24, for Catherine Sullivan, carriage-house, 19′ x 24′; A. J. Sullivan, builder.

Newton Pl., near Eaton Court, Ward 21, for Owen Reynolds, two-st'y dwell., 22′ x 32′; R. D. Ward, builder.

East Third St., near N St., Ward 14, for Michael W. O'Brien, two-st'y and mansard dwell., 21′ x 34′ 10″; ell, 15′ x 20′; Jas. Welch, builder.

Boylston Ave., near Green St., Ward 23, for Fred Kohlipp, 2 three-st'y dwells., 20′ x 30′; Jacob Luippold, builder.

Sagamore St., near Savin Hill Ave., Ward 24, for P. S. Sheane, dwell., 25′ x 28′; Wm. J. Jobling, builder.

Brooklyn.

BUILDING PERMITS. — *Greene St.*, n s, 150′ e West St., three-st'y frame tenement; cost, $3,800; owner, John Mill, 190 Ninth Ave., New York City; architect and carpenter, Albert Lange; mason, J. Reed.

Quincy St., n s, 100′ w Sumner Ave., 4 two-st'y brownstone dwells.; cost, each, $6,000; owner, A. K. Buckly, 180 Kosciusko St.; builder, A. Walker.

Adelphi St., w s, about 100′ s Fulton St., five-st'y brick factory; cost, $10,000; owners, R. Graves & Co., on premises; architect, E. F. Gaylor; mason, T. Gibbons.

Franklin Ave., s e cor. Atlantic Ave., 2 one-st'y brick stores: total cost, $2,500; owner, architect and builder, Philip Sullivan, 252 Patchen Ave.

Central Ave., n w cor. Forrest St., 4 three-st'y brick tenements and store in corner; total cost, $20,000; owners, S. Liebnann's Sons, Forrest St., cor. Bremen St.; architect, Th. Engelhardt; mason, Geo. Lehrian.

Henry St., w s, 50′ n Orange St., four-st'y brick store and flat; owner, Edward Phelps, 53 Orange St.; architect, M. J. Morrill; builders, H. D. and W. A. Southard.

Park Ave., s s, 25′ e Steuben St., three-st'y brick store and tenement; cost, $4,500; owner, William Plath, on premises; architect, J. D. Reynolds; builders, J. Rickard and T. Donnelly.

Nevins St., No. 175, between Wyckoff and Warren Sts., four-st'y brick tenement; cost, $5,000; owner and architect, James McGarry, 491 Warren St. builder, T. McCoy.

Lefferts Pl., n s, 320′ e Grand Ave., 3 three-st'y freestone dwells.; cost, each, $6,000; owner, architect and builder, B. Linikin, 216 Greene Ave.

Willoughby Ave., n s, 450′ w Marcy Ave., 3 two-st'y brownstone dwells.; cost, each, $4,500; owner, architect and builder, David Weild, 358 Gates Ave.

Third Ave., w s, 50′ n Twenty-fifth St., 3 three-st'y brick stores and dwells.; cost, $3,300 each; owner and architect, Thomas Pitbladdo, 213 Seventeenth St.; builders, W. & T. Corigan.

Bond St., n w cor. Second St., three-st'y brick dwell.; cost, $3,000; owner and builder, Chester Bedell, 337 Smith St.; architect and carpenter, Theo. Pearson; mason, Wm. Rountree.

Willoughby Ave., n s, about 80′ e Throop Ave., two-st'y frame dwell; cost, $8,000; owner, Mrs. A. A. Comstock, 274 St. James Pl.; architect, M. J. Morrill; builder, Jas. Lock.

Moore Ave., No. 87, n s, 100′ e Graham Ave., three-st'y frame tenement; owner, Jacob Kiefer, 152 Graham Ave.; architect, Th. Engelhardt; builder, J. Hofgesang; carpenter, not selected.

Central Ave., s e cor. Myrtle St., 2 three-st'y frame tenements; cost, total, $8,000; owner and architect, A. Sedlmeyer on premises; architect, Geo. Hillenbrand.

Bushwick Ave., e s, 125′ n Manhattan Ave., 25′ x 46′, three-st'y frame tenement; cost, $4,000; owner, architect and builder, Wm. Snowden, 294 Ewen St.

Nevins St., cor. Sackett St., one-st'y brick building for storing; cost, $2,500; owner, Fulton Municipal Gas Co., 342 Fulton St.; architect, J. F. Harrison; builder, R. Deeves.

Nevins St., cor. Sackett St., one-st'y brick purifying-house; cost, $20,000; owner, the Fulton Municipal Gas Co., 342 Fulton St.; architect, J. F. Harrison; builder, R. Deeves.

Park Ave., n s, 105′ e Marcy Ave., 6 two st'y frame dwells.; cost, each, $2,500; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, M. Engelhardt.

Chicago.

BUILDING PERMITS. — Mrs. Mary May, two-st'y and basement brick store and dwell., 24′ x 54′, 846 North Clark St.; cost, $4,500.

U. P. Smith, three-st'y brick dwell., 44′ x 50′, 3261 Cottage Grove Ave.; cost, $8,000.

Theodore Rhinehart, two-st'y brick dwell., 21′ x 60′, 149 Larrabee St.; cost, $2,500.

Peter Kimmey, two-st'y brick dwell., 22′ x 40′, 496 West Congress St.; cost, $2,500.

John Kuba, two-st'y and basement brick dwell., 22′ x 50′, 2521 Hanover St.; cost, $3,000.

H. Smith, two-st'y brick dwell., 22′ x 50′, 555 Warren Ave.

John B. Mallers, two st'y and basement brick dwell., 40′ x 48′, in Groveland Park; cost, $7,500.

Dr. Mueller, two-st'y and basement brick dwell., 24′ x 60′, 724 Twenty-first St.; cost, $5,000.

Lawson Varnish Co., one-st'y brick factory, 50′ x 80′, Kinzie St., near Bixby Place; cost, $3,500.

Geo. Hoefert, two st'y brick dwell., 22′ x 45′; Washtenaw Ave., near Jackson St; cost, $2,500.

Peter Adler, three-st'y and cellar brick dwell., 24′ x 57′, 272 East Huron St.; cost, $8,000.

Le Grand Smith, three st'y and basement brick flats, 50′ x 80′; Illinois St., near Cass St.; cost, $15,000.

Mrs. E. W. Evans, two-st'y brick dwell., 23′ x 43′, 59 Page St.; cost, $3,000.

Armory Association, First Regiment Cavalry, armory building, 125′ x 200′, on Michigan Ave., between Madison and Monroe Sts.; cost, $26,000.

J. Murphy, three-st'y and basement brick dwell., 21′ x 60′, 284 Hurlbut St.; cost, $4,500.

Mrs. A. Fleming, two-st'y and basement brick dwell., 22′ x 50′, 89 Evergreen Ave.: cost, $4,000.

W. K. Thomas, two-st'y and cellar brick dwell., 22′ x 53′, 260 West Congress St.; cost, $5,000.

D. O'Connell, two-st'y brick dwell., 23′ x 80′, 3452 Halsted St.; cost, $3,500.

M. O. Flaherty, two-st'y brick dwell., 22′ x 56′, 700 Thirty-first St.; cost, $4,000.

Wm. Walh, three-st'y and basement brick store and dwell., 577 Blue Island Ave.: cost, $15,000.

S. C. Wheedon, two-st'y and basement brick dwell., 32′ x 46′, 987 and 989 Wilcox St.; cost, $3,500.

Cincinnati.

THE MANUFACTURE OF BUILDING MATERIAL. — The forthcoming report of the Builders' Exchange is now going through the press, and the essential portions of it are furnished for publication. It shows that the amount of manufactured material used for building purposes during the past year aggregated from $12,000,000 to $13,000,000 in value. Such material only is included as is manufactured in Cincinnati. The increase of the product of last year is about fifteen per cent. This amount it is hardly probable will be equalled another year, for the reason that the strike of the building trades has seriously interfered with the operations of the present summer. It is observed that the character of the buildings in process of erection has improved. In the city proper the old two and three-story buildings are giving way to substantial six and seven story structures. Blocks of French flats have been found to pay a high rate of interest, and capital is being put freely into them. — *New York Times.*

ELEVATOR BIDS. — The bids for the Court-House elevators were as follows: William Miller, for elevators and towers combined, $8,650, and for elevators only, $5,285; H. J. Reedy, elevators alone, $5,650; James L. Haven & Co., elevators alone, $5,865; N. M. Dennis, elevators alone, $5,143; Malloy bid for the tower alone $3,365, which with Dennis's bid for the elevators makes the two bids together $8,408, or $142 less than any other bids. The Commissioners awarded to William Miller, the only bid for elevators and towers combined.

BUILDING PERMITS. — Since our last report the following building permits have been issued: —

W. W. Scarborough, addition to two-st'y brick dwell., Seventh and Vine Sts.; cost, $6,000.

Geo. Heeder, three-st'y brick dwell., No. 748 Vine St.; cost, $5,800.

St. Xavier's Church, to rebuild the steeple destroyed by fire; cost, $10,000.

Peter Frantz, two-st'y brick dwell., Spring Grove Ave.; cost, $5,000.

Chas. S. Sargeant, alteration to store on Fourth St. near Vine St.; cost, $3,000.

Wm. C. Huntington, addition to three-st'y brick dwell., Elm St., near Fifth St.; cost, $2,000.

Baptist Church, one-st'y frame dwell., cor. Dayton and Whitemore Sts.; Chas. Crapsey, architect; cost, $2,500.

N. Wells, three-st'y dwell.; Stoers St., near Baum St.; cost, $4,500.

Nich Mey, 2 three-st'y brick dwells., Gest St., near Mill Creek; cost, $10,000.

Nine permits for repairs; cost, $5,400.

Cleveland.

CHURCH. — A brick church on Aaron St., for the Third Evangelical Reformed Church Society; cost, $8,500; Coburn & Barnum, architects; Geo. King, builder.

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HOTEL. — A brick hotel, cor. St. Clair and Seneca Sts., for Mr. Hawley; cost, $22,000; N. P. Charlott, architects; Jas. Phillips, builder.

STORES. — A brick block, cor. St. Clair and Academy Sts., for Mr. Scofield; cost, $100,000; Levi Scofield, architect; Kane & Brooks, builders.

A brick block on St. Clair St., for Mr. Scofield; cost, $30,000; Cudell & Richardson, architects.

A brick block on St. Clair St., for Worthington & Co.; cost, $75,000; Cudell & Richardson, architects.

A brick block on Champlain St., for Wm. Body; cost, $15,000; Cudell & Richardson, architects; Philips & Doyle, builders.

A brick block on Euclid Ave., for Cobb & Bradley; cost, $30,000; Smith & Meyers, architects.

TENEMENTS. — A brick block of 6 tenements, for L. E. Holden, on Stearns St.; cost, $12,000.

HOUSES. — 2 frame dwells. on South Logan St., for J. M. Slaght; cost, $5,000.

A frame dwell. on Oakdale St., for Wm. Ormiston; cost, $3,000.

A frame dwell. on Oakdale St., for Mrs. B. Hewitt; cost, $4,000; W. G. Rattan, builder.

A frame dwell. on Bolton Ave., for A. G. Harbaugh; cost, $4,000; Robt. Quigley, builder.

A frame dwell. on East Prospect St., for George Lawrence; cost, $3,000.

A frame dwell. cor. E. Prospect and Lincoln Sts., for Jno. W. Coy; cost, $3,800; L. G. Middaugh, builder.

A frame dwell. cor. E. Prospect and E. Madison Sts., for Col. Pickering; cost, $2,600.

A frame dwell. on Madison Ave., for Wm. Sabine; cost, $3,000; Geo. Rattan, builder.

A frame dwell. on Geary Ave., for Julius Schulz; cost, $2,900.

A brick dwell. on Euclid Ave., for C. C. Canfield; cost, $5,000; F. Uhl, architect.

A frame residence on Strator Ave., for Wm. McReynolds; cost, $3,500.

A frame residence on Fairmount St., for C. W. Torry; cost, $3,000.

A frame residence for Wm. Marsh, on Stearns St.; cost, $2,000.

A frame dwell. for George Rattan, on Stearns St.; cost, $3,500.

A frame dwell. on Mayfield St., for Theo. Bates; cost, $3,700; C. O. Arey, architect; Hillborn & Marsh, builders.

A frame dwell. on Fairmount St., for C. Davis; cost, $3,600; Coburn & Barnum, architects; L. G. Middaugh, builder.

A frame dwell. on Fairmount St., for M. King; cost, $4,000.

A frame dwell. cor. Doan and Wilbur Sts., for A. Wilbur; cost, $2,900.

A frame dwell. on Republic St., for G. C. Ashman; cost, $3,500.

A frame dwell. on Republic St., for Chas. Lewis; cost, $3,000.

A frame dwell. on the "Ridge," for J. W. Heisley; cost, $3,800; Coburn & Barnum, architects.

A brick residence on Euclid Ave., for J. H. Ammon; cost, $18,000; H. L. Blair, builder.

A brick residence onEuclid Ave., for N. C. Brewer; cost, $12,000.

2 brick dwells. on Euclid Ave., for McBride Bros.; cost, $34,000; Coburn & Barnum architects.

A frame dwell. on Fourth Ave., for R. S. Kennedy; cost, $3,000; Smith & Meyers, architects; Kennedy & Lathold, builders.

2 frame dwells. cor. Scoville and First Aves., for Jas. Parker; cost, $4,600; Smith & Meyers, architects.

A stone dwell. cor. Euclid and Giddings Aves., for S. J. Miller; cost, $20,000; Jos. Ireland, architect.

A frame dwell. on Madison Ave., for T. M. Irvine; cost, $5,000; L. G. Middaugh, builder.

A frame dwell., cor. Euclid Ave. and Logan St., for J. E. Twitchell; cost, $6,000.

A frame residence on Wilson Ave., for C. A. Grasselli; cost, $18,000; Coburn & Barnum, architects; Cass & Simmons, builders.

Grand Rapids, Mich.

BUILDING PERMITS. — Mr. Thomas D. Gilbert, a large three-st'y warehouse; cost, about $8,000.

Mr. A. E. Stockwell, dwelling-house, Madison Ave.; cost, $6,000.

Mrs. C. Cumming, dwelling-house, Crescent Park; cost, $3,000.

The city is building two new ward school-houses, at a cost of about $8,000 each.

Mr. Allen Durfee, dwelling-house, on Fourth Ave.; cost, $2,000.

Mr. W. D. Frost, house on Clancy St., n of Trowbridge St.; cost, $1,800.

Mr. C. W. Coit, two houses on Lyon St., n of College Ave.; cost, $1,500 each.

Mr. G. B. Clark, residence on cor. of North Lafayette and Hastings Sts.

It is estimated that there are in course of construction 1,000 dwelling-houses within the city limits. A large proportion of them are tenement-houses, ranging in price from $800 to $2,000 each.

Louisville.

BUILDING PERMITS. — The following building permits have been issued since last report: —

Jacob Meifert, brick dwell.: cost, $3,000.

Geo. Birch, brick stock-shed; cost, $3,000.

C. W. Kompfe, brick dwell.; cost, $2,000.

Home of the Aged and Poor, brick asylum; cost, $8,000; H. Struby, architect.

W. W. Sinton, brick dwell.; cost, $2,500.

Miss Johanna Barrett, brick dwell.; cost, $3,500; C. A. Curtin, architect.

New York.

CHURCHES. — On the s s of Fifty-seventh St., between Eighth and Ninth Aves., St. Timothy's Episcopal Church is to be built. The church will be built of brick, with sandstone front, in the Gothic style; Messrs. D. & J. Jardine are the architects.

The same gentlemen are drawing plans for the Emmanuel Baptist Mission Church, which is to be built on Suffolk St., near Grand St., from a donation of Mr. J. A. Bostwick. The building will be of brick, with granite finish, and will include lecture, class and school rooms.

STABLE. — A stable, 50′ x 100′, which will probably cost about $60,000, is to be built of brick, with Carlisle stone finish, at Nos. 157 and 159 West Fifty-sixth St., for Mr. Frank Work, from designs of Mr. Geo. Edward Harding.

BUILDING PERMITS. — *Fortieth St.*, n s, about 400′ from bulkhead, 430′ w of Eleventh Ave., two-st'y brick office; cost, $4,000; owners, C. E. Appleby, Broadway, Horatio Reed, Manager Union Stock Yard and Market Co.; architects and carpenters, Axford & Cranmer; mason, O. E. Perrine.

Broome St., Nos. 358 *and* 360, six-st'y brick furniture warehouse; cost, $29,000; owners, P. Nathan & Co., 87 Bowery; architect, W. Jose; builders, Jos. Schaeffler & Co.

Eighth Ave., s e cor. One Hundred and Twenty-fifth St., 5 four-st'y brick tenements; cost, one $25,000 and the others each $12,500; owner, Alva S. Walker, 43 West One Hundred and Thirtieth St.; architect, T. E. Thomson.

West Fifty-sixth St., Nos. 157 *and* 159, one and two st'y brick stable; owner, Frank Work, 13 East Twenty sixth St.; architect, G. E. Harding; builders, W. A. and F. E. Conover.

West Sixteenth St., Nos. 418 *and* 420, 2 five-st'y brick tenements; cost, each, $12,000; owner, John W. Dexter, 120 Broadway; architect, J. M. Dunn; builders, Smith & Prodgers.

West Sixteenth St., Nos. 418 *and* 420, rear of lots, 2 three-st'y brick stables; cost, each, $5,000, owner, etc., same as last.

One Hundred and Thirty-second St., n s, 280′ e Sixth Ave., four-st'y brick tenement; cost, $14,000; owner and mason, Cowan Kays, 172 East One Hundred and Twenty-seventh St.; architect and carpenter, A. T. Wilson.

One Hundred and Twenty-first St., n s, 211′ 6″ w Fourth Ave., 3 three-st'y Connecticut brownstone dwells.; cost, each, $12,000; owner and architect, Alfred Kehoe, 259 West One Hundred and Twenty-third St.; builder, John Askey.

One Hundred and Twenty-first St., n s, 142′ 6″ w Fourth Ave., 3 four-st'y brownstone tenements; cost, each, $15,000; owner, architect, etc., same as last.

East Fortieth St., No. 127, four-st'y brick and brownstone dwell.; cost, $12,000; owner, J. L. B. Smith, 125 East Fortieth St.; architect, E. H. Kendall; builders, Sinclair & Wills.

Elizabeth St., No. 209, three-st'y iron, brick and stone dwell.; cost, $18,000; owner, City New York; architects, N. Le Brun & Son.

Third Ave., w s, 20′ s proposed One Hundred and Fifty-fifth St., Twenty-third Ward, three-st'y brick store and tenements; cost, $7,000; owner, Mrs. Sophia Lerch, One Hundred and Fifty-first St., near Courtlandt Ave.; architect, H. S. Baker.

Fifty second St., n s, from 425′ to 500′ w of Sixth Ave., 3 three-st'y brick and New York State blue-stone stables; cost, each, $20,000; owners, architects, and builders, McCafferty & Buckley, 810 Fourth Ave.

One Hundred and Seventh St., s s, 75′ e Second Ave., four-st'y brick dwell. and stair-builder's shop; cost, $3,000; owner, Mrs. Bridget Hogan, Second Ave., n w cor. One Hundred and Seventh St.; architect, A. Spence.

Eighty-first St., s s, 100′ e Fourth Ave., 2 six-st'y brick and brownstone tenements; cost, each, $60,000; owner, Frederick Correll, 110 East Eighty-second St; architect, J. Hoffmann.

East One Hundred and Fifty-seventh St., s s, lots 238 and 239, two-st'y frame factory; cost, $2,900; owner, David Sturzegger, One Hundred and Fifty-seventh St., near Elton Ave.; builders, John Diehl and F. Schwab.

Gramercy Park, n e cor. Twentieth St., eight-st'y brick hotel; cost, $300,000; owner, James Campbell, No. 62 South Fifth Ave.; architect, G. W. Da Cunha.

One Hundred and Thirtieth St., n s, 175′ w Eleventh Ave., 3 four-st'y brick tenements; cost, each, $11,000; owner, Charles Bornkamp, 170 Robbins Ave.; architect, Jas. Barrett.

Cortland St., No. 37, five-st'y brownstone building; cost, about $25,000; owner, Peter Henderson, Vreeland St., Jersey City; architect, L. H. Broome.

One Hundred and Third St., n s, 100′ w Second Ave., 2 four-st'y brick tenements; cost, $13,500; owner, C. Nurge, Eighty-second St., near Ave. B; architect, J. Brandt; builder, not selected.

Beekman St., Nos. 134 *and* 136, 2 four-st'y brick stores; cost, each, $7,500; owner, Mrs. Cordelia J. Stewart, 152 Fifth Ave.; architects, D. & J. Jardine.

Park or Fourth Ave., e s, 51′ s Eighty-first St., 2 five-st'y brick tenements; cost, total, $50,000; owner, architect and builder, J. Bentley Squire, 21 East Seventy-ninth St.

Third Ave, e s, 75′ n One Hundred and Fortieth St., four-st'y frame tenement; cost, $6,000; owner, Richard Gaffney, Mott Haven; architect, J. Rogers; builder, J. O Kane.

Third Ave., s w cor. Sixty-fifth St., four-st'y brick saloon and dwell.; cost, $12,000; owner of leasehold, Ernest Conrades, 270 East Seventy-eighth St.; architect, J. Kastner.

Lexington Ave., s e cor. Eighty-first St., six-st'y brick apartment-house; cost, $80,000; owner and builder, Bernard Spaulding, 150 East Forty-sixth St.; architects, Thom & Wilson.

ALTERATIONS. — *Broadway, No.* 49, two-st'y brick extension, main building altered for offices; cost, $37,000; owner, Angelo L. Myers, 103 East Thirty-seventh St.; architect, Hy. Fernbach; builder, Marc Eidlitz.

East Forty-first St., No. 11, two-st'y brick extension, etc.; cost, $5,000; owner, Samuel V. Day, on premises; builders, Smith, Prodgers & Co., and Morton & Chesley.

Fifth Ave., No. 252, two-st'y brick extensions, first st'y and front alteration; cost, $3,000; lessee, Eliza Rallings on premises; architect, G. E. Harding.

Eighth Ave, *Nos.* 351 *and* 353, add one-st'y mansard roof; also, two-st'y iron and brick extensions, etc.: cost, $14,000; owner, Eliza J. Ross, extrx. of George Ross, 353 Eighth Ave.; builders, Robt. L. Darragh & Co.

St. Mark's Pl., No. 23, three-st'y brick extensions, etc.; cost, $6,000; owner, Wm. Schwind, on premises; architect, R. Maynicke; builders, John Schmitt and Hy. Weiler.

West Fourteenth St., No. 38, one-st'y brick extension; cost, $3,500; lessee, Bernhard J. Ludwig, on premises; architect, R. N. Anderson.

East Fifty-third St., No. 62, three-st'y brick extensions; cost, $2,500; owner, Edward V. Loew, on premises; architect, A. Selleck; builders, R. Shapter & G. Culgin.

Broadway, Nos. 877 *and* 879, front alterations, etc.; owner, B. Cunard, England; architect, S. D. Hatch; builders, R. L. Darragh and Haden & Winans.

West Forty-fifth St., No. 12, two-st'y brick extension, etc.; cost, $5,000; owner, Frank C. Hollins, 12 West Forty-fifth St.; architec , H. E. Ficken; builder, A. Gibbons.

West Fifty-third St., No. 17, one-st'y brick extension, interior alterations; cost, $5,000; owner, W. B. Baldwin, on premises; architect, G. B. Pelham.

Third Ave., w s, 75′ n One Hundred and Thirty-eighth St., raised one st'y, new brick front; cost, $3,000; owner, Michael Schmiderer, on premises; architect, John Kaeb.

West Twenty-third St., No. 109, two-st'y addition, etc.; cost, $6,000; owner, Joseph Morette, on premises; architects, Berger & Baylies.

State St., No. 15, covering block between Bridge and Pearl Sts., two-st'y addition; cost, $9,000; owner, R. A. Chesebrough, 17 East Forty-fifth St.; builder, J. M. Kelly.

East Fifty-first St., No. 119, one-st'y brick extension, 18′ x 69′, tin roof; cost, $2,500; owner, R. A. Chesebrough, 17 East Forty-fifth St.; builder, J. M. Kelly.

Fifth Ave., Nos. 252 *and* 556, *and West Thirty-sixth St., No.* 32, are being overhauled, decorated and improved, under directions and from designs of Mr. Geo. Ed. Harding.

Philadelphia.

HOTEL. — Mr. P. S. Donner intends to build on Tenth St., above Chestnut St., a five-st'y hotel, 38′ x 90′, to be built of pressed brick and galvanized iron; E. F. Durang, architect.

BUILDING PERMITS. — *Church St.*, s s, e of Hamilton St., three-st'y dwell., 14′ x 16′; Martin Kellar, contractor.

Frankford Road, e s, s of Clearfield St., three-st'y dwell., 20′ x 68′; James McCartney, contractor.

Fifth St. and Lehigh Ave., s w cor., 2 two-st'y dwells., 17′ x 28′; W. Bartholomew, contractor.

N. Broad St., No. 833, four-st'y brick building and two-st'y stable, 16′ x 50′ and 30′ x 40′; R. J. Whiteside & Son, contractors.

Eighth and Arch Sts., n w cor., two-st'y store, 54′ x 72′; Levi Koder, contractor.

Leiper and Arrat Sts., s e cor., three-st'y dwell., 20′ x 40′; J. K. Foulkrod, owner.

Wharton St., No. 640, three-st'y dwell., 15′ x 52′; A. Taylor, contractor.

N. Sixth St., No. 2119, three-st'y store and dwell., 25′ x 80′; Eldridge & Stewart, contractors.

Hope St., e s, n of Somerset St., 4 two-st'y dwells., 20′ x 36′; W. A. M. Fuller, owner.

Hancock St., w s, n of Huntington St., 2 two-st'y dwells., 19′ x 46′; William Steel, contractor.

Huntington St., s s, bet. Mascher and Mutter Sts., three-st'y dwell., 24′ x 46′; William Steel, contractor.

Twelfth St., e s, s of Nevada St., two-st'y factory and two-st'y stable, 34′ x 45′ and 16′ x 16′; John Klebe, contractor.

Eleventh and Colona Sts., n w cor., 2 two-st'y dwells., and 1 three-st'y dwell., 17′ x 54′; John Klebe, contractor.

Snyder Ave., n s, w of Fifth St., 5 two-st'y dwells., 16′ x 42′; Clayton Allen, owner.

Frankford Road, e s, bet. Richmond and Allen Sts., two-st'y brick building, 46′ x 50′; W. R. Farrell, contractor.

Mechan Ave., n s, bet. Main and Musgrove Sts., 2 three-st'y dwells., 15′ x 32′; William Garvin, contractor.

Cumberland St., s s, bet. Jaspar and Emerald Sts., three-st'y dwelling, 18′ x 60′; John Mitchell, contractor.

Hancock St., e s bet. York and Cumberland Sts., two-st'y dwell., 18′ x 46′; John Mitchell, contractor.

Jackson St., No. 4658, 2 three-st'y dwells., 16′ x 42′; R. B. Ott, owner.

N. Tenth St., No. 2409, three-st'y dwell., 16′ x 52′; L. K. Slifer, owner.

Randolph St., No. 1441, two-st'y brewery, 19′ x 44′; George Kessler, contractor.

Fifth and South Sts., s e cor., three-st'y store, 36′ x 120′; Snellenberg & Co., owners.

N. Tenth St., No. 1629, two-st'y factory, 18′ x 93′; C. Bachle, contractor.

Green St., No. 1825, four-st'y brick building, 21′ x 54′; Morrell Dobbins, owner.

Fleming St., n e s, n w Cotton St., 2 two-st'y dwells., 16′ x 40′; J. W. Gilton, contractor.

Markle St., n of Terrace St., two-st'y dwell., 14′ x 32′; Peter Mullen, owner.

N. Fourth St., No. 414, two-st'y stable and carriage-house, 15′ x 22′; J. F. Betz & Son, owners.

Fowler St., n e s, n w of Jefferson St., two-st'y dwell., 17′ x 32′; Charles M. Horner, owner.

Cumberland St., e s e, bet. Mill and Coulter Sts., two st'y dwell., 14′ x 27′, John Patrick.

Front St., e s, n of Dauphin St., third and fourth st'y addition to factory, 46′ x 114′; Eldridge & Stewart, contractors.

Carlisle St., n w cor. Dauphin St., 3 two-st'y dwells. and 1 three-st'y dwell., 19′ x 42′; J. N. Pattison, contractor.

Somerset St., n s, between Helen and Jasper Sts., 12 two-st'y dwells., 15′ x 38′; Duryea & Childs, contractors.

Amber St., n e cor. Rush St., two-st'y dwell., 18′ x 52′; Chas. Hohberger, owner.

Thirty-eighth St., No. 749, s of, 2 three-st'y dwells., 18′ x 58′; J. A. Palmer, contractor.

Cook St., s s, w of Goul St., 2 two-st'y dwells., 18′ x 58′; J. C. Beiber, contractor.

Eleventh St., s w cor. Marks Lane, three-st'y brick building, 19′ x 24′; W. P. Fogg, contractor.

Norton St., s s, between Wayne and Green Sts., two-st'y stable, 16′ x 31′; H. H. Burzby, contractor.

Walnut St., s s, 115′ e of Forty-second St., three-st'y dwell., 35′ x 88′; W. S. Kimball, contractor.

South Broad St., No. 1120, three-st'y dwell., 20′ x 45′; W. Brooks, owner.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co. No. 344.

JULY 29, 1882.

Entered at the Post-Office at Boston as second-class matter.

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Two deaths of distinguished Americans are reported this week, which will have a sad personal interest for many of our readers. Mr. Robert Briggs of Philadelphia, an engineer of the highest accomplishments and reputation, died Monday afternoon after a long and painful illness. Mr. Briggs was born in Boston, May 18, 1822, and was educated in that city, entering afterwards as a pupil the office of Alexander Parris, an engineer and architect of note in his day. Removing later to Philadelphia, he was employed there and in Washington in many important works, particularly in the extension of the Capitol, under General Meigs, and in the construction of the Washington acqueduct. His taste for experimental science led him to investigate the phenomena involved in ventilation, and he soon became distinguished in this branch of engineering, planning and carrying into execution the scheme of ventilation for the legislative chambers in the Capitol, as well as for many other public and private buildings. For a time he held also the direction of Morris. Tasker and Company's iron-works at Philadelphia, and was subsequently associated with Mr. Henry S. Morris in the Southwork Foundry Enterprise. Of late years his failing health demanded some cessation of his more active employments, and he became widely known as a consulting engineer, and as a writer upon technical subjects. Several of his letters and papers have appeared in this journal, of which he was a kind and constant friend from the first. He was an honorary member of the American Institute of Architects, and a member of various societies of civil and mechanical engineers in this country and in England.

MR. GEORGE PERKINS MARSH, the American Minister to Italy, also died on Monday at the little village of Vallombrosa, in his eighty-second year. We need not say that for nearly two generations the name of Mr. Marsh has been familiar to all who know anything of American letters and scholarship, and since his graduation from college in 1820 his zeal in the cause of learning and science has never failed. In 1842 he was elected to the National House of Representatives from his native state of Vermont, retaining his seat until 1849, when he was commissioned as resident Minister to Constantinople. In 1853 he returned home, and was employed in various important public services until 1861, when he was appointed the first Minister of the United States to the new Kingdom of Italy. This post he held continuously until his death, to the honor both of his native country, whose citizens shared unconsciously the regard in which he was held, and of that to which he was accredited, where his position was that of a beloved and trusted friend alike of Court and people. To him hundreds, and perhaps thousands, of Americans are indebted for kindnesses and courtesies which they will never forget, and throughout Europe as well as the United States his death will be mourned with sincere grief.

Two English architects of distinction have within a few days followed their associates, Street and Scott, to their eternal rest. Joseph Aloysius Hansom the elder of the two, had completed, in his eightieth year, a life full of success and happiness. Beginning his career as an apprentice to his father, a joiner, when only thirteen years old, his general capacity and taste for design led to his transfer to the office of an architect of ability, under whom he acquired a knowledge not only of his new profession, but of many other matters in which his active mind interested itself. He married early in life, and soon afterward entered into business on his own account, winning almost at the outset the important competition for the Birmingham Town-Hall. Although the Town-Hall Commissioners took the usual advantage of his youth and inexperience, and drove him into bankruptcy before the work was completed, he gained a reputation, and was thenceforth never without employment. In the first few years of poverty after his misadventure with the Birmingham Commissioners he was induced to undertake work not strictly within the scope of his profession, and at the suggestion of friends perfected and patented what he called a "Safety Cab," which was subsequently introduced in London, and has made his name a household word wherever the English language is spoken. In 1842 the idea of founding an illustrated journal for the service of the building trades and professions occurred to him, and on the 31st day of December in that year he issued the first number of the *Builder*. He had not, however, sufficient capital to carry on this enterprise, and soon transferred it to other parties, to devote himself thenceforth wholly to his profession. Much of his work was ecclesiastical, and being himself a devout Catholic, a large part of the modern Romanist churches in England were designed by him or his son, who was for many years his partner. The beautiful church of St. Philip Neri at Arundel is probably familiar to our readers from the drawings published in the English professional journals, and the Convent of Our Lady at Plymouth is in some respects even more admirable. Besides these, the *Builder* enumerates fifty-five other churches executed from his designs, with many secular or semi-ecclesiastical structures.

A DAY or two after Mr. Hansom's decease died Mr. George Somers Clarke also an ecclesiastical architect of great ability. His designs were generally in that massive style first introduced, we believe, by Mr. James Brooks, but were at the same time thoroughly well studied and graceful in a dignified and simple way. In matters relating to his profession he was unusually intelligent and well informed, and few of the younger architects gave promise of greater distinction. With the next English mail we shall undoubtedly receive further details of his career, which although so short has brought him honor enough to satisfy a moderate ambition, and will try to select some of the most interesting particulars for the benefit of the younger readers.

THE Edison Electric-Light Company has so far completed its preparations for actual illumination in its first district in New York that a circular has been sent out, addressed to all owners or lessees of buildings in that district who have had wires for the light put into their rooms, informing them that service connections with the street mains are to be immediately made, and reminding them of the terms of the contract under which the wires were introduced,—that if after trial, the occupants of any building should decide to adopt the electric-light permanently, he must pay the cost of wiring the building, and of the service connection; but if not, that no charge whatever should be made against him. There are about eleven hundred houses in this district, and the making of service connections and introduction of lamps will occupy two or three weeks. After that, some preliminary experiments are to be made before the general lighting of the district, but this is expected to occur by September 1, or perhaps earlier. Meanwhile the residents of that part of Chrystie, Houston and Stanton Streets nearest to the great engine-rooms of the Brush Company in Stanton Street are becoming alarmed at the prospect of having machinery of such tremendous power placed so near them, and have addressed a unanimous remonstrance to the Board of Health, claiming that the heat from the huge boilers will be unwholesome and annoying, to say nothing of the danger of fire or explosion. The region is one crowded with swarming tenement-houses, and these complaints, probably have some

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foundation, but it is hardly likely that the proceedings of the company will be interfered with.

Notwithstanding the high prices of labor and materials the aggregate of building operations in New York during the past six months surpasses that for a like period at any time within the history of the city. Between January 1 and July 1 thirteen hundred and sixty-five permits were issued from the Bureau of Buildings for new structures, and nineteen hundred and ninety-eight permits for alterations. The total estimated cost of the new buildings was more than twenty-six million dollars, or nearly twenty thousand dollars apiece, but this high average is partly due to an unusual proportion of very expensive structures, such as office-buildings and apartment-houses. The latter, particularly, are steadily advancing in popularity, and the more recent ones are constructed with great thoroughness, and a corresponding outlay of money. The fashion of lofty building has spread rapidly and structures of nine and ten stories are becoming common. It is to be hoped that no earthquakes will occur to frighten the owners of such property before they have derived a reasonable return from their investment, but it will do no harm to remember that New York is situated in a region by no means exempt from such phenomena, and that a few shocks of unusual vigor would make havoc with many of the most costly buildings in the city. Some of the older mechanics in New York can remember the panic which seized upon real-estate proprietors there many years ago on account of the excessive loftiness of certain mercantile buildings, most of which were razed one or two stories in consequence, and the next generation may witness a similar revulsion of feeling, if nothing worse.

The Royal Institute of British Architects has suffered a little loss of dignity through the well-meant, but rather injudicious zeal of some of its officers in volunteering advice which was not asked for, and, as usually happens in such cases, was not very graciously received. It seems that the British Government intends to build new offices for the Admiralty and the War Department, upon ground very near the Foreign Office building, just completed from Sir Gilbert Scott's designs. One of the façades is to extend about four hundred and fifty feet along the short street called Whitehall, from the Foreign Office to Charing Cross, while the other faces St. James' Park, on which are also situated Buckingham Palace and other fine buildings. Two narrow streets which now lead from Charing Cross to the Park are to be widened, and altogether the scheme seems to be a promising one. It did not, however, please the Council of the Institute, who took upon themselves the responsibility, as soon as the block plan was made public, of instructing the Honorary Secretaries to write an official letter to the Commissioner of Public Works, protesting against its adoption. Instead of the two new sixty-foot streets, the protest urged that a single avenue one hundred feet wide ought to be made from Charing Cross to the Park and demanded further that all the existing structures between the proposed site of the new buildings and Trafalgar Square should be swept away, so as to expose a third façade to the frequenters of the "finest site in Europe." As this would involve an enormous expense there is very little probability of the suggestion being carried out, but the gentlemen who prepared the letter were so persuaded of the soundness of their advice as to announce, rather incautiously, in the last clause, that the President of the Institute would be happy to attend any meeting of the Parliamentary Committee, and give such further explanations as might be desired. The opportunity which this proposition offered for snubbing the authors of what probably seemed to the committee an officious interference with their affairs was too good to be lost, and no notice whatever was taken of the offer.

Although the result of this well-meant but imprudent proceeding is naturally mortifying to the members of the Institute, and others who care for the dignity of the profession, it does not follow that architects as a body have no right to express their opinion upon matters of public interest concerning which their special knowledge enables them to judge correctly: on the contrary, their advice in such affairs is of great value, and should be received with the utmost respect; and any want of consideration or other circumstance which may tend to lessen the authority of such suggestions is to be deplored. In this case the most serious mistake seems to have been the precipitation with which what purported to be the sentence of the collective profession was pronounced upon a plan shown to be merely tentative in character by the announcement which accompanied it, that the design for the building indicated in it would be selected in competition. The sweeping character of the criticism contained in the letter was again injudicious, since there was certainly room for a variety of opinion in regard to some of the points considered, and those constituents of the Council who had, or might have had, a different way of looking at the matter, were entitled to the respect which would be shown by extreme caution in the treatment of doubtful points. The principal value of the utterances of such a body depends upon their being incontrovertible, and hasty or uncalled-for criticism, however well intentioned, is best left to individual responsibility.

The announcement, made by authority of a Government Bureau, that the white pine forests of the United States would at the present rate of consumption furnish less than twelve years' supply of that indispensable timber, although copied into most of the papers, has not received the general attention which it deserves, and probably will not until the advancing cost of pine lumber brings the lesson forcibly home to the public mind. This advance has, however, already begun, the price of pine land in the great timber-producing states having doubled within a few weeks, and the question of the employment of some other material for the coarser uses of building is earnestly discussed among architects and contractors. On some accounts the substitution of hard wood for pine in the finishing of houses would tend to promote their solidity as well as their artistic interest, both of which are compromised by the universal habit of using hard wood only in the form of veneers or casings upon grounds of cheaper material; but a decided progress will have to be made in the art of seasoning and working the timber of deciduous trees before it can be used in large pieces in a way to satisfy those accustomed to the straightness, smoothness and unvarying character of pine. For framing, spruce and hemlock, with whitewood in the Southern and Middle states, will probably soon occupy the field entirely, and the makers of laths and shingles will perhaps transfer their industry to the forests of hemlock or arbor-vitæ. For interior finish, ash, oak, including many kinds now rejected, chestnut, black birch, walnut and elm, may be turned to good account, while for exterior work the deciduous varieties will probably be introduced before long, for the sake of variety, if not of economy, and with them a style of design different from that now practised, to which they are totally unsuited.

After prolonged consideration the Committee of the House of Representatives on Foreign Affairs has presented a majority report favoring the incorporation of the Maritime Canal Company of Nicaragua, and recommending the acceptance by Congress of the provision in the charter under which the United States, for the encouragement of a work of such great public utility, is to guarantee three per cent interest on the cost of the canal for twenty years after its completion, but with the proviso that the sum upon which interest is to be thus guaranteed shall not exceed seventy-five million dollars, and that no obligation shall be incurred by the United States until the canal is in actual and successful operation. The members of the committee seem to have made a thorough investigation of the scheme, and have very prudently secured certain modifications in the plan of the canal before giving it the sanction of their favorable report, increasing, for instance, the minimum depth to twenty-eight feet, and requiring a length of six hundred feet in all the locks. With these modifications they regard the scheme as a good one. One of the best features is the great width of the water-way for a considerable part of the distance across the isthmus. Of the entire length of the canal, something like four-fifths consists of a chain of lakes, in which the largest vessels can manœuvre, or lie at anchor and refit in smooth water, and this advantage will go far to offset the inconvenience of the locks, about which the advocates of the sea-level canal at Panama have so much to say. The Democratic members of the committee, while not fully concurring with their colleagues, present a minority report favoring the incorporation of the company, but advising delay until proper assurances are received that no obstacle will be placed in the way of the undertaking by foreign powers, and disapproving the proposed guarantee of interest by the United States.

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THE ENGLISH CATHEDRALS.—IV.

CANTERBURY Cathedral stands on the site of the primitive Roman or British church attributed to King Lucius, which was sacked and destroyed by the Danes, rebuilt by Canute, and finally completely burned in 1067. Nothing of this building remains.

The succeeding cathedral was begun between 1070–1089, and was finally dedicated 1130. In 1174, four years after the murder of Becket, the "glorious choir of Conrad" was burned, but within ten years was again rebuilt. Immediately after this the nave and transepts were taken down and rebuilt. The existing edifice embraces in itself portions of these different works.

The following dates are assigned:—

1070–1109. Crypt as far as Trinity Chapel, and the towers of St. Andrew and St. Anselm.

1174–1184. Choir (the longest — 180′ — in England.)

1178–1184. Retro-choir and crypt eastward of Trinity Chapel.

1304–1305. Choir-screen.

1378–1411. *Perpendicular.* — Nave.

1495. *Perpendicular.* — Central, or "Bell Harry" tower above the roof.

1449–1468. Lady-chapel.

1472–1492. Chapter-house.

1840. The northwest tower is finished by Mr. G. Stevens.

The romantic and historical interest that centres about Canterbury perhaps excels the interest that is excited by its architectural merits. The first resting-place of the Christian Church in England, from which went out the itinerant preachers of the Gospel to the native Saxons, and to which they looked for aid and counsel when they had established churches elsewhere; later the seat of the primate of England, who in early days played no mean part in the temporal affairs of the realm; the burial-place of many of the saints, bishops and fathers of the church — Dunstan, Anselm, Becket; the background, as it were, of many a quarrel between church

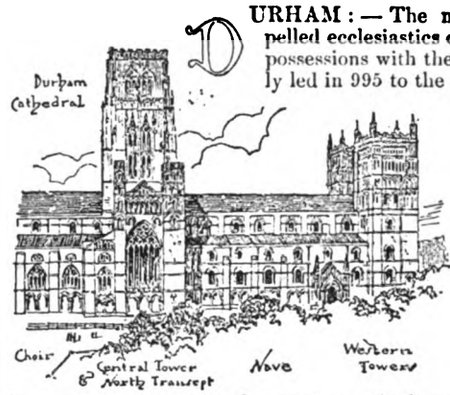
and state, in which the figures of Lanfranc, Anselm and Becket loom up with a gloomy splendor; and finally, as the scene of one of the most notorious of the many acts of bloody sacrilege which have been enacted within the most sacred precints, the murder of Thomas à Becket, Canterbury possesses as great interest for the student of history as of architecture, and while the former pictures to himself the struggle between the strong-willed Becket, actively aided only by the monk Grim, and the four knights, sycophants of Henry II, the latter can imagine William of Sens, the master-builder or architect of the present choir, falling from a scaffold fifty feet above the choir floor, and afterwards from his sick-bed giving instructions to his successor, William of England, as to how the work should be carried on; and he will, while his brother student notices the flights of steps leading up to the choir, Trinity Chapel, and the aisles of the retro-choir worn by the knees of climbing pilgrims and penitents, understand that the unusual differences of level which necessitate these steps is caused by the existence of huge crypts below,—crypts which Elizabeth assigned to the use of the French and Flemish refugees, clothiers and silk-weavers, driven from their homes by the fierce zeal of the Duke of Alva, and where for many years the noise of the silk-loom was heard.

But the elevation of the choir-floor levels is not the only unusual thing about this portion of the building. The marked expansion and contraction of the choir-walls is very noticeable and was caused by the architect's desire to connect his new work with the towers of St. Anselm and St. Andrew, which had not been destroyed by the fire.

Of the towers, the northwestern one is quite modern, having been finished as late as 1840, and replaced the Norman tower known as the "Arundel steeple;" the southwestern tower or "Dunstan steeple" dates from 1413–1517. The central tower or "Bell Harry" replaces the "Angel" steeple and dates from 1495–1517, and is therefore Perpendicular in style. It is 235′ high.

The Norman staircase shown in the cut leads up to the grammar school, and is the only one known.

DURHAM: — The necessity which compelled ecclesiastics of old to defend their possessions with the strong hand probably led in 995 to the selection of the present commanding site of the cathedral as the final resting-place of the body of St. Cuthbert, with which in 875 the monks had fled when the Danes attacked Northumbria. Here a little church was built of the branches of the forest trees that thickly covered the hill. A second temporary wooden church was at once built and a stone church was at the same time begun, and so far finished that in 999 St. Cuthbert's remains were placed in their final resting-place.



Between 1071–1080 the Castle of Durham was founded by the Conqueror, and shortly after the Earldom of Northumberland was conferred on the bishop who thus became one of the mightiest of temporal and spiritual potentates in the realm. In his Norman Conquest Freeman says: "The Prelate of Durham became one, and the more important, of the only two English prelates whose worldly franchises invested them with some faint shadow of the sovereign powers enjoyed by the princely churchmen of the Empire. The Bishop of Ely in his island, the Bishop of Durham in his hill-fortress, possessed powers which no other English ecclesiastic was allowed to share. Aidan and Cuthbert had lived almost a hermit's life among their monks on their lonely island; their successors grew into the lords of a palatinate, in which it was not the peace of the king but the peace of the bishop which the wrong-doer was in legal language held to have broken. The external aspect of the city of itself suggests its peculiar character. Durham alone, among English cities, with its highest point crowned not only by the minster but by the vast castle of the Prince-Bishop, recalls to mind those cities of the Empire — Lausanne, or Chur, or Sitten, where the priest who bore alike the sword and the pastoral staff looked down from his fortified heights on a flock which he had to guard no less against worldly than against ghostly foes. Such a change could never have taken place if the see of St. Cuthbert had still lingered in its hermit-island; it could hardly have taken place if he had finished his wanderings on a spot less clearly marked out by nature for dominion. The translation of the see to Durham by Ealdhun is the turning-point in the history of the great bishopric."

The monks who brought St. Cuthbert's body to Durham, and their successors were after a time replaced by secular canons who, towards the end of the eleventh century, were supplanted in their turn by monks who since the conquest had been established at Wearmouth and Jarrow. The mode of monastic life requiring a greater variety of buildings and larger, probably led to the removal of Ealdhun's cathedral, and the beginning in 1093 of the present vast and complicate structure, the plan of which Bishop Carileph is said to have brought with him from Normandy on his return from a short period of banishment. The work then begun was probably continued without interruption until, about 1128, the Norman Church consisted of a "choir terminated by a triple apse; a low central tower; transepts with eastern aisles; and nave terminating in two western towers." To this building as a nucleus alterations and additions have been made until the plan of the building has been developed into one of extreme interest and beauty. The following dates have been assigned:—

——— *Norman.* — Crypts below the refectory.

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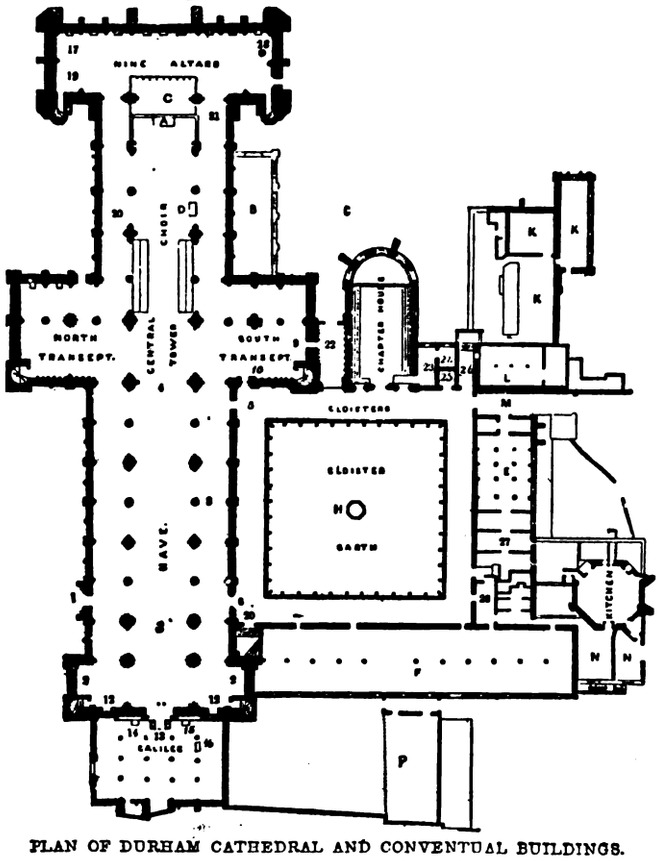
1093–1095. *Norman.* — Choir and aisles.
1095–1099. *Norman.* — Great transept.
1099–1128. *Norman.* — Nave and western towers.
1133–1143. *Norman.* — Remains of Chapter-house.
1153–1195. *Transition.* — Lady-chapel or Galilee (west porch).
Circa—1230. *Early English.*—Eastern transept or "Nine Altars."
Circa 1400. *Perpendicular.* — Dormitory, now the new library.
1388–1437. *Perpendicular.* — Cloister.
1457–1480. *Perpendicular.* — Upper part of central tower.



PLAN OF DURHAM CATHEDRAL AND CONVENTUAL BUILDINGS.

The misfortunes that have fallen on the cathedral have been not so heavy as in the case of many others: Work on a Lady-chapel at the east end had to be abandoned because of the failure of the foundations, a mischance which led to the building of the Gallilee in its present position; the short spire crowning the central tower was struck by lightning in 1429 which eventually required the entire rebuilding of the upper part of the tower which was not finished until 1480; after the battle of Dunbar, 1650, Scottish prisoners confined in the Cathedral burnt the wood-work and defaced the altar, screen and monuments; between 1778 and 1800 important "repairs" were made by Wyatt who scraped and cut away the stone-work of the north side and the western towers quite destroying the character of their mouldings. Wyatt also partly pulled down the chapter-house, and proposed to destroy the Galilee for the purpose of making a drive around the west end of the building. This piece of vandalism was prevented only by the earnest remonstrances of the Society of Antiquaries. But for some reason either this society did not raise its voice in remonstrance, or its pleadings were unheard, when in 1796–1797 a scandalous piece of destruction was carried out. At that time the chapter-house, the finest Norman chapter-house in England, was found too plain, comfortless and inconvenient for the purposes of the iconoclastic dean and chapter, and it was determined to replace it by a more elegant and commodious structure. The work of destruction was carried out in the most barbarously wanton way: the keystones of the groin-ribs were knocked out, and the whole roof was made to fall in a mass into the building and upon the tombs and gravestones, which no one took the pains to remove. The eastern apsidal end was then removed; but here the work halted. A new lath-and-plaster wall was built within the remains, the east end was closed by a plain wall, the floor was boarded over and a plaster ceiling built. In 1830 parts of this make-shift work were removed, so as to disclose the original work.

At various times during the present century the central tower, the east transept, the south side of the nave and the choir have passed through the hands of different restorers.

The interior is more satisfactory than the exterior, both in its general disposition and in much of its detail. One of the first things that attract the attention is the alternation of circular nave and choir piers with square piers faced with clustered shafts. These massive circular piers are ornamented in the choir by deeply-incised spiral lines, while in the nave the incised lines take the form of lozenges, zig-zags, and vertical flutings alternately. It has been suggested that these incisions were once filled with colored plaster or metal-work, but as no trace of either has ever been discovered, the suggestion seems unwarrantable.

The arches of the central tower rising to an unusual height, their crowns being level with the vaulting of the nave, give an unusual air to this part of the structure. The quadripartite vaulting of the nave, with its pointed ribs, was probably put up in the transition period.

A cross of blue stone in the pavement of the nave just below the great north door marks the point, according to tradition, beyond which women were not allowed to advance into the cathedral. It is said that even in those early days woman's rights were seen to require more equitable treatment at the hand of the church, and one of the leading motives in building the Galilee — so styled because women were looked on by St. Cuthbert and his adherents as a species of Gentile — was to provide a more ample space where more women could, at a respectful distance to be sure, profit by beholding the mysterious rites in which husbands and brothers were allowed to share.

LINCOLN Cathedral in its early days had various misadventures: the original Norman building built 1073–1092 was partly burned in 1124, as a consequence of which event the wooden nave roof was replaced by stone vaulting, and in 1185 the Cathedral was "cleft from top to bottom by an earthquake." The greater part of the building is Early English in style, and it ranks third in size and importance amongst Early English churches, the whole of the interior being of this style.

The cathedral is unusually varied in outline of plan: chapels, galilee-porch, chantries, and vestries, come pricking out all about the eastern end of the building and lend an added interest to, while they do not interfere with the larger and more noble portions, the west front and towers, the double transepts, the central tower, the retro-choir and the chapter-house. The elevated site shows off the building in a most imposing way, and as the cathedral is approached from the east the visitor gains a better impression of the whole mass, than in the case of other cathedrals where he is at once confronted by the western façade which is usually of such interest as to make other parts of the exterior seen afterward unnaturally insignificant.

The west front loses in harmony of style while it gains in interest because, probably from lack of funds, the lower stories of the Norman towers, and the central door-ways, and bands of sculptured figures were not replaced by Early English work.

Above this Norman work and on either side of it in the western chapels the west front is Early English, built in 1209–1235, and consists of stories of arcades of varying height and importance.

The interior of the nave is perhaps disappointing, although the details are good and the whole satisfying in that it is a complete specimen of Early English.

The central or Broad Tower—corruption of Rood Tower— fell in 1240, during the delivery of a denunciation of the bishop by one of the canons who exclaimed: "If we should hold our peace, the very stones would cry out against us;" at which words the tower fell. Notwithstanding his having been the cause of the disaster the bishop at once began to rebuild the tower, which was finished by his successor in 1300–1320. In this tower hangs "Great Tom of Lincoln" originally cast in 1610 and recast in 1835, enough new metal being added to increase its size by seven inches in diameter at the mouth and its weight by one ton: it now weighs 5 tons, 8 cwt., and across the mouth measures 6′ 10½″. It is the only one of the great bells of England which is occasionally swung, and is exceeded in size only by the new bell at St. Paul's, "Great Tom" at Oxford, "Great Peter" at Exeter, and probably by the big bell in the clock-tower of the Houses of Parliament. "Great Tom," before it was recast, hung in the northwest tower.

One of the most famous features of the cathedral is the Angel's Choir or presbytery, which consists of the retro-choir of five bays which extends beyond the eastern transept. The retro-choir obtains its popular name because of a series of Early English sculptured angels, thirty in number, which fill the spandrels of the triforium arches. Casts of a portion of this series can be seen in the architectural rooms of the Boston Museum of Fine Arts.

One of the structural curiosities of the place is the stone beam which extends between the western towers just above the vaulting of the west porch. It is built in the form of a very flat arch of twenty-three stones, each 11″ thick and 1′ 9¾″ broad, the lengths being unequal. There are no indications that iron was used in its construction, and yet the joints seem to have been carelessly cut and the mortar in them is fully half an inch thick; yet nevertheless the

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beam stands securely, though "it vibrates perceptibly when it is jumped upon."

An unusual feature for an English cathedral is the southeast porch which opens into the presbytery; it is a very fine composition.

The chapter-house, here shown, is called by Pugin "truly grand."

ROCHESTER.—The Saxon cathedral at Rochester, the earliest Christian church established beyond Canterbury, was in ruins at the time of the Norman conquest. In 1077, however, its rebuilding was begun and was continued until 1130, when it was duly consecrated. The great transept was built about 1200 and the choir somewhat later, so that the cathedral consists, briefly, of a Norman crypt and nave, with Perpendicular clerestory and an Early English choir and transept. There are, too, Decorated windows in the choir, and the doorway of the chapter-house is of the same period.

The cathedral was seriously injured by fire in 1138, and again in 1177, and during the siege of Rochester by Simon de Montfort, in 1264, it suffered a good deal. At this time, and afterwards in the times of the Puritans, the nave was turned into a stable, and after it was abandoned by the troops of the Commonwealth the nave was used as a carpenter's shop, and several saw-pits were dug in it. Of course much injury was done to the building at these times, and the monumental brasses, in which it was particularly rich, were entirely removed and destroyed.

This cathedral has many of the peculiarities of the cathedral at Canterbury, as that was endowed by its Norman builder, Lanfranc, with the peculiarities of St. Stephen's at Caen, particularly the peculiarity of the triforium arches opening onto the aisles.

The nave is covered by a wooden roof, as originally intended, so that the nave piers are lighter than is usual in Norman buildings.

The choir is elevated above the nave because of the existence of a crypt beneath its whole length, so that as at Canterbury it is reached by ascending a flight of steps.

Considerable alterations and restorations were in 1825–1830 made by Mr. Cottingham to the choir, to the chancel east of the east transepts, and to the central tower.

Gundulf's tower on the north side, between the transepts, is thought to have been the storage place for the records and charters, and to have been divided into two strong chambers, access to which was had only from the top.

INDUSTRIAL EDUCATION.

APROPOS of the recent report on Industrial Education, at the educational convention at Saratoga, — made by a committee of which Gen. Francis A. Walker was chairman, — it is not uninteresting to remember that one of the first practical attempts to give industrial education through the public schools was made under the auspices of an architectural society.

Some of us remember a little pamphlet circulated at Philadelphia in 1876, and giving some account in Dutch and English of the Ambachtsschool or Artisans' School at Rotterdam, Holland. Founded in 1869 at the instance of the Rotterdam Chapter of the Architectural Society of the Netherlands, with the approval of the government, and with the partial support of the town council, it seems to have been the pioneer in this work on the Continent. Children in the reformatory schools, it is true, more fortunate than their more respectable contemporaries, had long been taught useful trades through the intervention of public or private charities. Many manufacturers, too, had found it necessary to train their workmen in schools connected with their factories, in order to obtain work sufficiently good to bear increasing competition. Moreover, the many higher technical schools of the Continent were offering advanced instruction to young men ready to enter the technical professions. But, after all, these three classes — those of paupers and criminals, of workmen attached to a few scattered factories, and of professional men — really comprised a pitiably small proportion of the working population of Europe. What was to be done with the great remainder of untaught, incapable, discontented workmen, was a question practically untouched when the Ambachtsschool was founded, with the avowed intention of educating skilful artisans for the public good, and at the public expense.

This was what the Rotterdam architects did in 1869. Now, there is hardly a country in Europe where similar measures are not receiving earnest consideration. Germany, moved thereto by her socialistic difficulties, raises the cry of "Education for labor through labor!" Shops are being annexed to the schools here and there with most gratifying results, and it is worthy of note in passing that the boys are drawn into these shops for their four hours per week of work, not only from the *realschulen* but also from the gymnasia, or Latin school, and that the teachers find their pupils more ready in Greek and Latin for this awakening of the active powers of the observation. Many of these shops are maintained by private enterprise; but the school teachers themselves are now being taught as a preliminary to a probable recognition of these courses by the government. A normal course was to be opened, for instance, at Dresden, on July 17, with the coöperation and support of the Saxon Minister of the Interior and of Education, and for the special benefit of the teachers of Saxony; and similar courses elsewhere have led to good results. Denmark, Austria, Russia, Norway and Sweden are making similar efforts. In Gothenburg, for example, twenty shops have been annexed since 1878 to the schools corresponding in grade to our grammar schools, in which 1,370 boys received instruction during the year 1877–79 at the public expense. These schools are both popular and successful, and the reports made of them are extraordinarily interesting; but more detailed accounts of the daily work and methods of instruction in these various schools cannot be given in the present article.

It is to France, however, that we must turn for the most thorough success. In 1873 a few enthusiasts won the consent of the government to the introduction of the study of carpentry into a single public school—that of the Rue Tournefort. The experiment succeeded beyond expectation. When the boys left the school, at the age of sixteen, they were already capable of earning something at their trades, while their general education had not been abated in any material particular. Says the director, M. Laubier, in a recent letter, "A large number of our pupils have distinguished themselves in the career which they have chosen, and what is really remarkable, *not a single one has changed his profession*, changes being very frequent among those pupils who have not had this training and guidance in school." So admirable were the results attained by this one experiment that Paris now boasts forty-two public schools in which equal attention is paid to manual and intellectual training, and what is more, the new code of education requires that every pupil in the French schools of the grammar grade shall be taught *the use of the tools employed in the principal trades*, as well as the applications of science to the industrial arts and to all the forms of manual labor. "The Republic of France," said the supporters of this feature in the code, "has need of contented and intelligent citizens: let us therefore train the children of France to sober labor, rather than to factious idleness. Again, France as a nation is ambitious of wealth and power: let her train her useless hands to money-making and to skilled labor." The French code of education, as it stands now, is nothing if not patriotic; every clause is aimed to secure the aggrandizement or the protection of the French idea, and the fact that this matter of industrial training has been allowed to take up so much space in its provisions, shows how strongly the need of the masses for this industrial training has been borne in upon the French patriots.

So much for what has been done abroad since the Architectural Society established the Ambachtsschool in 1869; but what of ourselves in America? We are, it is true, coming to a more or less grudgingly given recognition of the Kindergarten, which maintains the same principle of manual training in its modelling and weaving, and we too have our higher technical schools for the supply of the technical professions, and our reformatory industrial schools. But as regards the teaching of industrial skill in our ordinary schools and at public expense, the years have shown only a long series of isolated appeals from charitable associations, of occasional argumentative addresses and reports at educational gatherings, and of isolated practical efforts here and there like Professor Adler's Workingmen's School in New York, or the whittling schools in Boston and Gloucester. This year, indeed, a decided advance was made in Boston, where permission was gained from the School Board to give instructions in wood-work for two hours a week to classes in the Dwight School; but, although the experiment was encouraging in

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results, it was maintained under difficulties by private liberality, and it was neither so widely known nor so justly appreciated as it should have been.

Why do we not realize more keenly and effectively the need for this industrial reform? Apart from the cogent educational reasons advanced for this training of hand as well as of brain, and apart from the advantages to national prosperity to be derived from the increase of money-earning power engendered by increase of skill, are not the causes which operated so powerfully upon the Rotterdam architects in 1869 working disastrously with us to-day? The little Ambachtsschool pamphlet above referred to is prefaced by the following statement: —

"The great scarcity of trustworthy and clever workmen, so keenly felt for several years, has certainly caused many an architect and many a builder to wish that something efficient might be done in order to train up young artisans to clever workmen. In the present day, now that the wages of workingmen do not always increase in the same ratio as their wants, the workshops are no longer, as they formerly may have been, the best schools for young beginners. In order to earn for themselves as much as possible the men have no time to occupy themselves with the boys. Every minute which a workman devotes to helping his young companion is a loss to himself. So the youngsters have no other means left to qualify themselves for their trade than 'looking at what the men do,' and it may be easily comprehended that such cannot be called a proper training." Probably there are few architects in the United States to-day who would not heartily subscribe to this statement, or who could not illustrate it by countless discouraging experiences of their own with workmen. Indeed, some of our younger architects, at least, would probably have been heartily thankful if they, as well as the workmen on whom they depend, were a little better equipped in the matter of a practical knowledge of the every-day processes of the building arts. The young architect of the schools is often looked on with just distrust by reason of his theoretical facility and his corresponding capacity for practical blunders, and he is sometimes advised to try a course of brick-laying to bring him to his senses. Ought he not, from his own experience of the need for systematic industrial training, to lend his co-operation to the movement practically inaugurated by his brethren of Rotterdam?

Mr. Morris would teach us to believe that our art can never be regenerated until our artisans take pleasure in their work, and make their work an expression of their pleasure. Can artisans or architects take pleasure or express pleasure in doing what they do not know how to do well? What, then, is to become of our art if artisans or architect remain ignorant and unskilled in the very constructive features on which their art is based, and out of which it should grow? The much quoted workman of the Middle Ages had been trained by experiment and observation to a realizing sense of the function of the capital, and he bodied forth his skill and his pleasure therein in his carving, and made it art, but we can hardly blame our workman of to-day for not giving expression to his skill, and to his pleasure therein, when he has no skill and consequently no pleasure to express. If Mr. Morris be right, we need this training for the children of our artisans and architects, not only that we may have thorough work, — well-paid and well-paying work, — but also that we may give both artisan and architect an opportunity to work simply, unconsciously, — in short, with a skill which has become second nature, — toward that artistic perfection over which we have spent so many vague, unembodied aspirations, and so much purposeless and pedantic criticism.

THE ILLUSTRATIONS.

A RENAISSANCE DINING-ROOM MANTEL AND BOOK-CASE. BY B. J. TALBERT.

[From the *Cabinet Maker and Art Furnisher.*]

THIS mantelpiece is a capital example of the period of English Renaissance dating from Elizabethan to Jacobean, and in producing this design Mr. Talbert evidently had Elizabethan in his mind, for he does not hesitate to employ the Tudor arch for the grate-opening. We need hardly say that many specimens of Elizabethan belonging to the transition period are mixed with Tudor Gothic, and this composite character is looked upon by some as a charm rather than an objection. In this sketch the designer has ignored the modern craving for plate-glass, and substitutes some choice panelling and wood carving in its place.

This combined sideboard and book-rack is interesting because it exemplifies the style in which Talbert first made a reputation—viz., domestic Gothic. He was the designer who first applied Gothic to domestic furniture in a satisfactory manner, and some consider his book on "Gothic Forms as applied to Wood-work" the most valuable of all his publications. Every previous attempt at Gothic furniture by Pugin and others had been too architectural, and it was left for the then young Scotchman, to show how the ecclesiastical style could be reduced to homely purposes. Thus Talbert paved the way for a return to the thoroughness and solidity in furniture now so prevalent. We do not much admire Gothic in any form for domestic furniture, it is almost invariably so cheerless and clumsy, but if it is to be tolerated at all the library is the apartment for it.

TOMB IN THE CEMETERY AT BORDEAUX, FRANCE. M. BOUSSARD, ARCHITECT. M. A. JOUANDOT, SCULPTOR.

[From *Le Moniteur des Architectes.*]

THE FIRST-PRIZE DESIGN IN THE INTERNATIONAL COMPETITION FOR THE VICTOR EMMANUEL MONUMENT.

[From the *Builder.*]

The first premium has been carried off, as already mentioned, by a young French architect, M. Henri Nenot, who has not yet reached his twenty-ninth year, and who gave early promise of distinction. Having made a journey in 1880 to Delos, Smyrna, Bairout, Baalbeck, Damascus, Jerusalem and Jaffa, passing thence to Egypt, and ascending the Nile for the purpose of studying classic art, he on his return entered the list of competitors for the Victor Emmanuel monument. Full of the impressions gained during his journey, he evolved the design which has been awarded the first prize of 50,000 lire. His work resembles the Piazza del Plebiscito of Naples, and would be a second Piazza di San Pietro, but chaster in style, more in accordance with the rules of classic art, and somewhat smaller. He proposes it to be placed in the Piazza di Termini, Rome. It is of semi-circular form, a triumphal arch occupying the centre, and facing this is placed an obelisk, a modified form of Trajan's Column in the Place Vendôme, Paris. Sculpture plays an important part in M. Nenot's design, fifty-one statues being distributed over the semicircle and the triumphal arch. Four triumphal cars, in the form of the bigas of the Roman circus, surmount the arch and the ends of the arcade respectively. The column in the centre bears the figure of Victor Emmanuel in modern dress, its base being surrounded by eight statues. Four fountains complete the decoration of the monument. The column is covered with bas-reliefs, winding spirally round it, and representing scenes from the Italian wars of independence. The design of M. Nenot admits of an alternative: an equestrian statue of Victor Emmanuel may take the place of the triumphal column if the judges should deem fit to substitute it. The wall spaces of the portico of the arcades are to be filled with reliefs.

RAMBLING SKETCHES. THE OSWESTRY OLD CHURCH. BY MR. T. RAFFLES DAVISON.

[From the *British Architect.*]

The Oswestry Old Church is an instance in which "restoration" must have been very welcome. It appears to have had little good work about it, and to have chiefly gloried in a fine old tower, which has been singularly battered about and patched up. Therefore the £10,000, which the late Mr. Street expended on the restoration has been very largely devoted to the production of new work of original design; in Mr. Street's hands this has been a good thing, for he has evidently taken great pleasure in the work, and the new open-timber roofs, nave arcades, reredos, pulpit, and tracery windows are all very good examples of his skill. The church, as restored, is a large one, holding, at a pinch, some 2,000 people, without galleries, and the effect of the interior is very varied and interesting. As my purpose has been chiefly to show some of the excellent details of Mr. Street's work I will refer those who care to know the history of the work to a sixpenny pamphlet, published by Messrs. Roberts, Woodall, and Venables, of Oswestry. I believe the cost of the reredos here shown, the central portion being alabaster, was about £700. The font holds seated figures of the four evangelists round the bowl. The Yale Monument of which I have given a sketch, records the death, in 1616, of Hugh Yale, an alderman of the Corporation, who, from 1578, when he was made a burgess, to the time of his death, was a prominent citizen of Oswestry. The monument is also in memory of "Dorothy, his wife, daughter of Roger Roden, Esq., of Burton, in the county of Denbigh." The Yales were of the same family as the one of that name who founded a college in America. He and his wife were buried in the St. Mary *chancel* of the church; and the monument over them being destroyed in the Civil Wars, the one now existing was erected near the western door of the nave, in the north aisle. Pennant, and other historians following him have, it seems, misread the inscription on it by adding commas where none exist, and so made it appear that the church was destroyed in 1616, and that the *building* was dedicated to St. Mary, a fact which I originally took for gospel when I made the sketch view in 1879—hence the title on the illustration. But thanks to the courtesy of a local archæologist, I now stand corrected. Oliver Cromwell is credited with having stabled 1,000 horses in this church, which was not only impious, but impossible, and the cavaliers of Charles I are reported to have battered the tower nearly down: therefore, whichever side we take to represent good or evil, it is evident that the church was, just at that period of its history, out of favor both with God and the devil.

ALTAR OF ST. PHILIP NERI, FOR THE NEW ORATORY CHURCH, BROMPTON, S. W. MR. HERBERT GRIBBLE, ARCHITECT.

[From the *Building News.*]

The transepts of the new Oratory church are utilized as two chapels — the south is known as the Lady-chapel and the north as the St. Philip Neri, the founder of the order of Oratorians. The former chapel is already provided with an altar, which, for the last two hundred years, has done duty as the high altar at a church in Brescia, North Italy, now demolished to make way for a hospital. It is undergoing considerable repair, and receiving such additions and alterations as will fit it for its new abode. It dates from the latter part of the seventeenth century, and is somewhat Debased in architectural detail; but, nevertheless, cannot fail, from the richness of its material, to be a very attractive and exceptional feature in an

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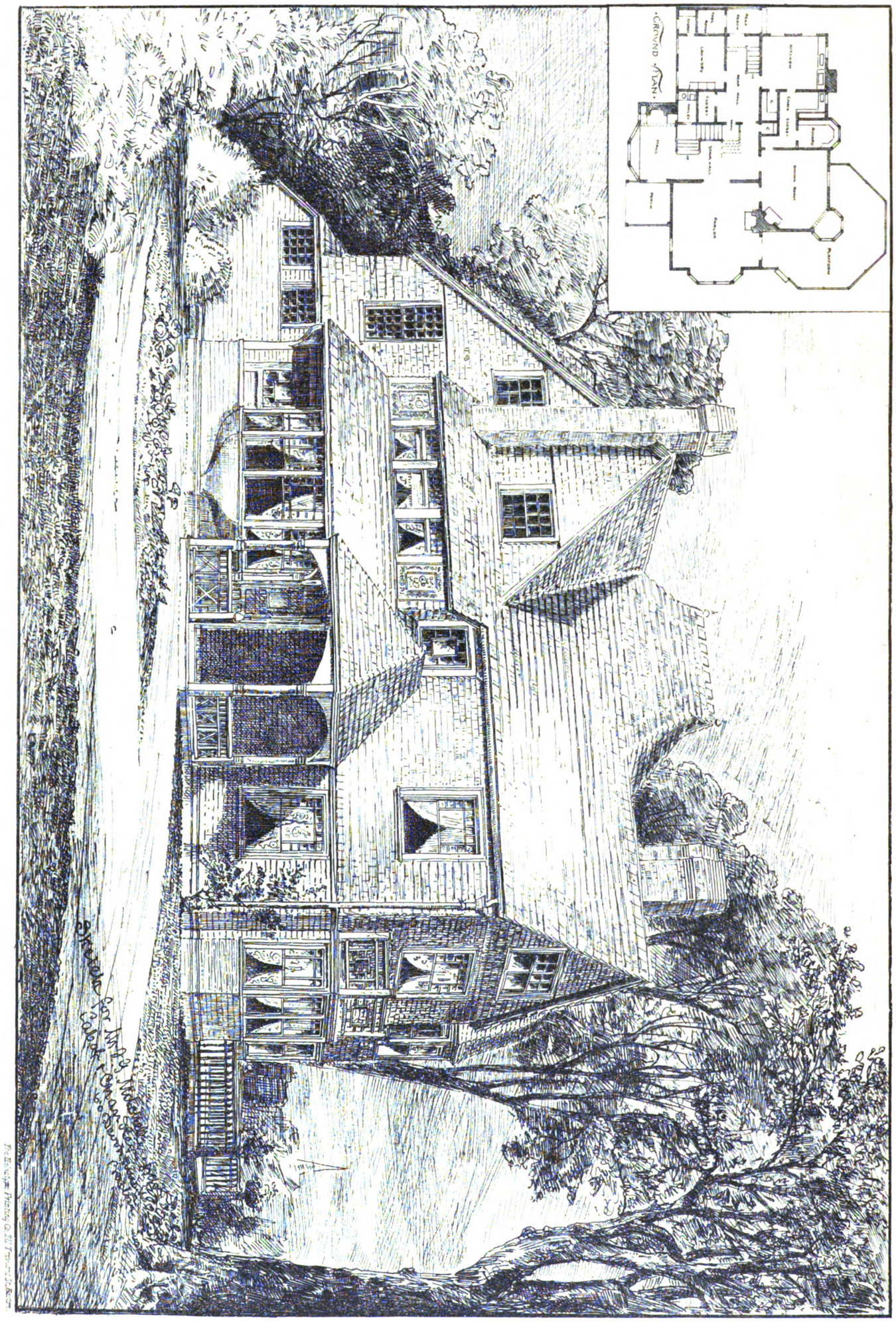

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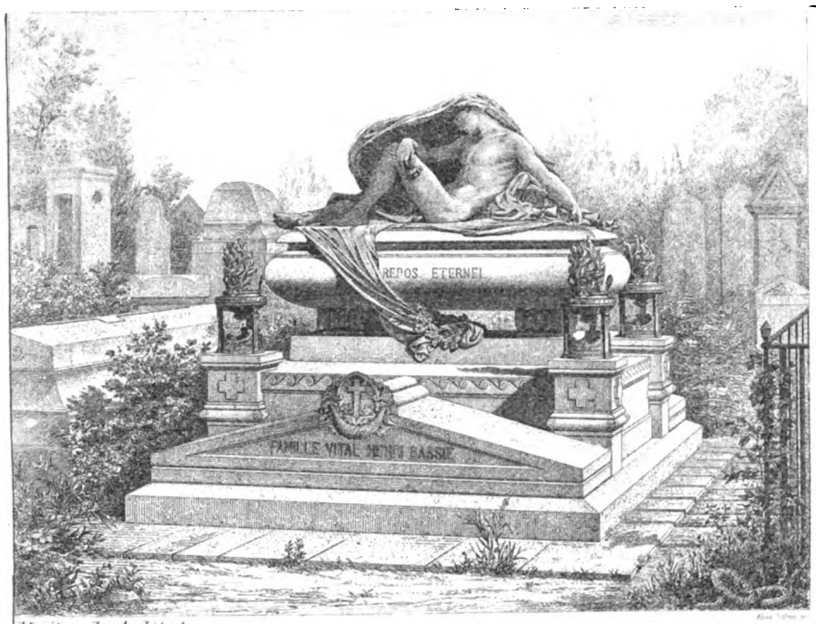
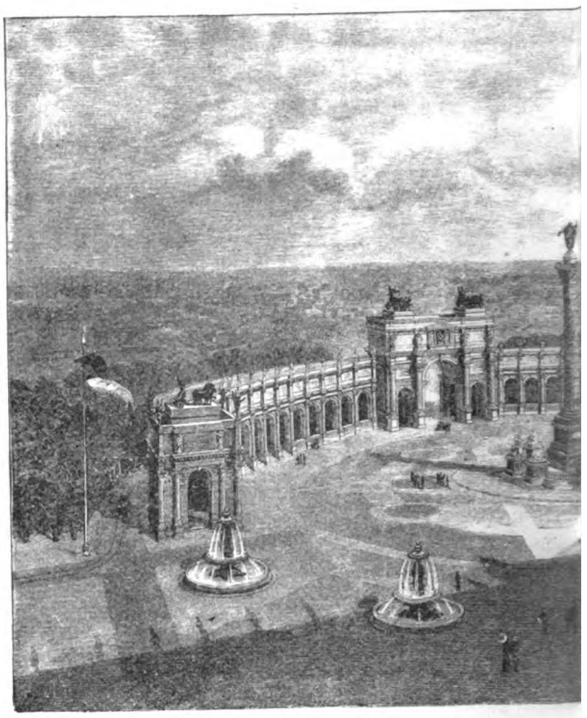


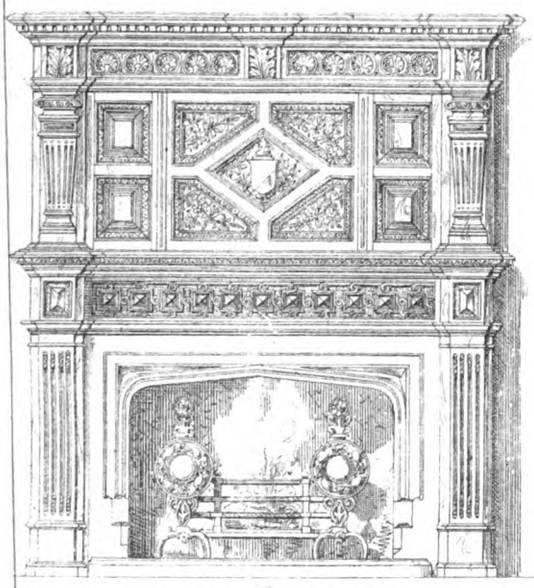
Moniteur des Architectes

TOMBEAU AU CIMETIERE DE BORDEAUX
FIGURE DU REPOS ETERNEL PAR Mr A JOUANDOT SCULPTEUR
Mr BOUSSARD ARCHITECTE

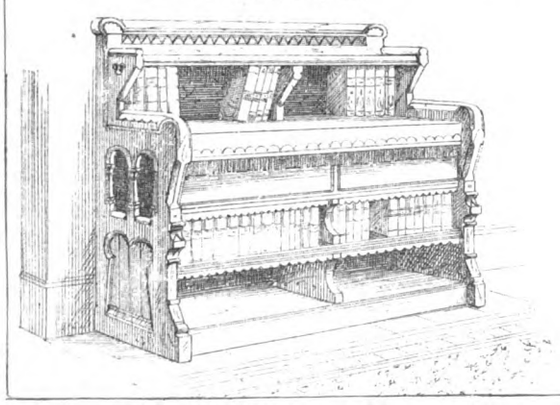


DESIGN FOR THE VICTOR EMMANUEL MONUMENT, ROME: PI

OUR FOREIGN EXCHANGES··VI

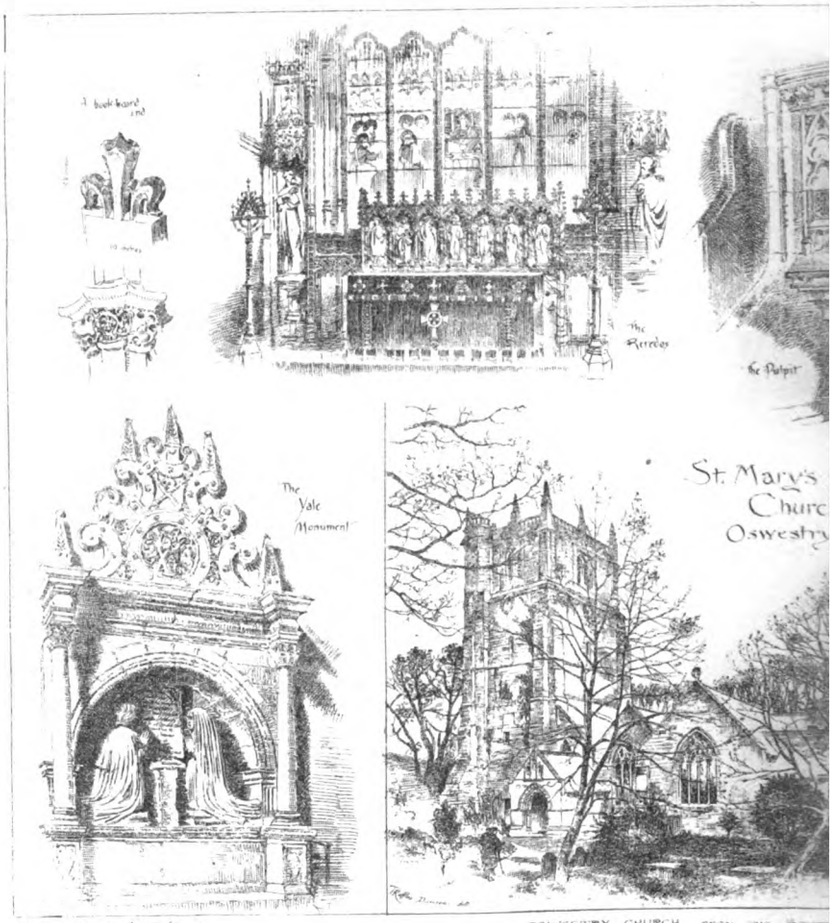


Renaissance Mantelpiece. By Bruce J. Talbert



Designs for Bookcases. By Bruce J. Talbert.

THE CABINET MAKER AND ART FURNISHER



The British Architect.

OSWESTRY CHURCH FROM THE SOUTH
Restored by G. E. Street, R.A.

The Heliotype Printi

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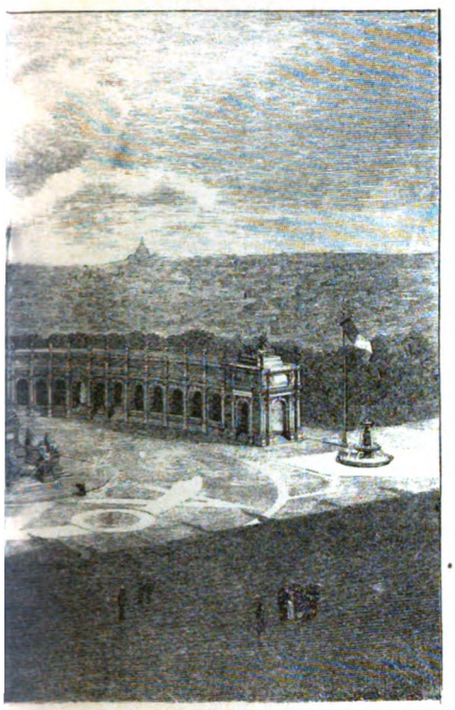
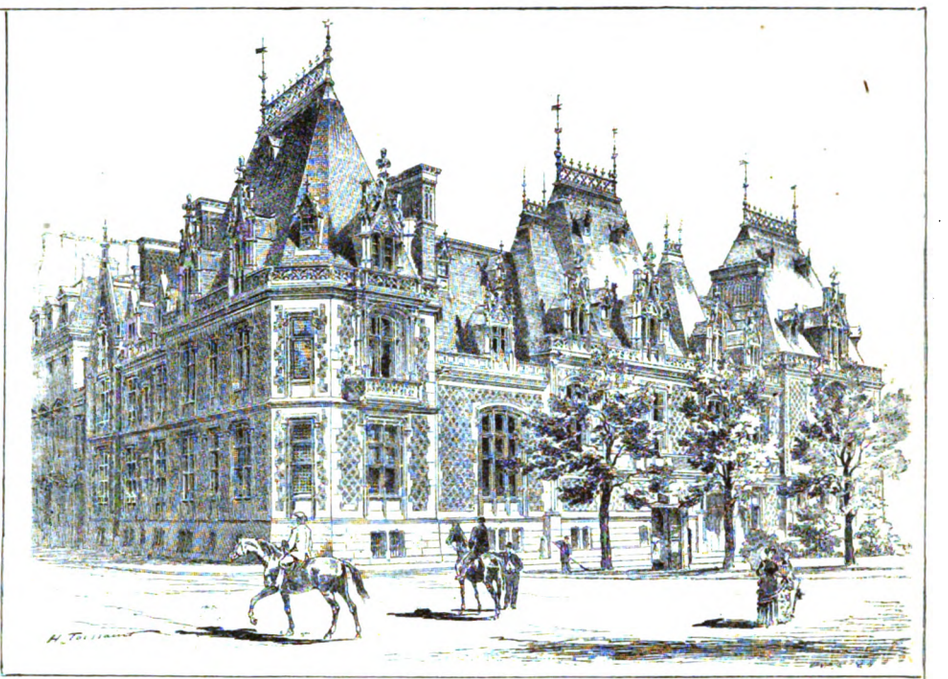
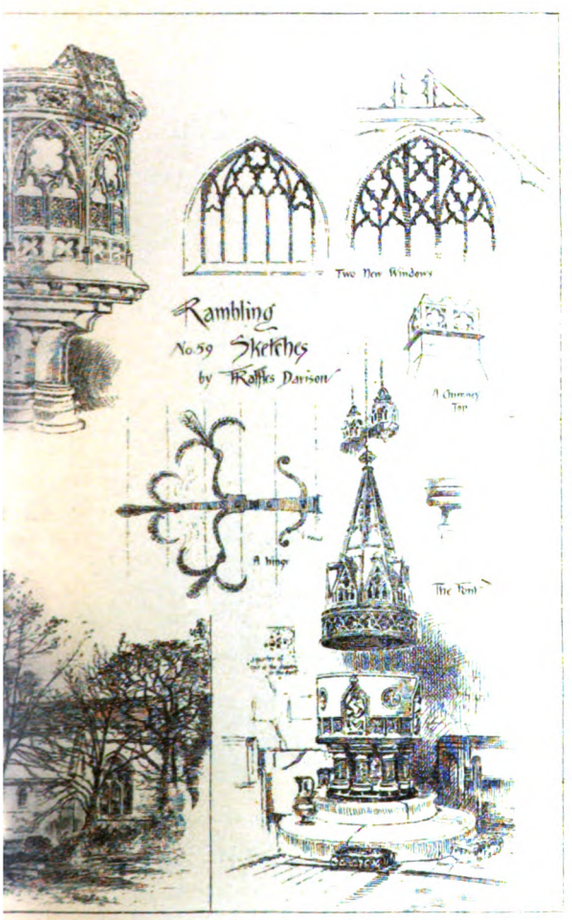


THE BUILDER.

1ST PREMIUM.—By M. Xanto, Architect



La Semaine des Constructeurs



ART 1879

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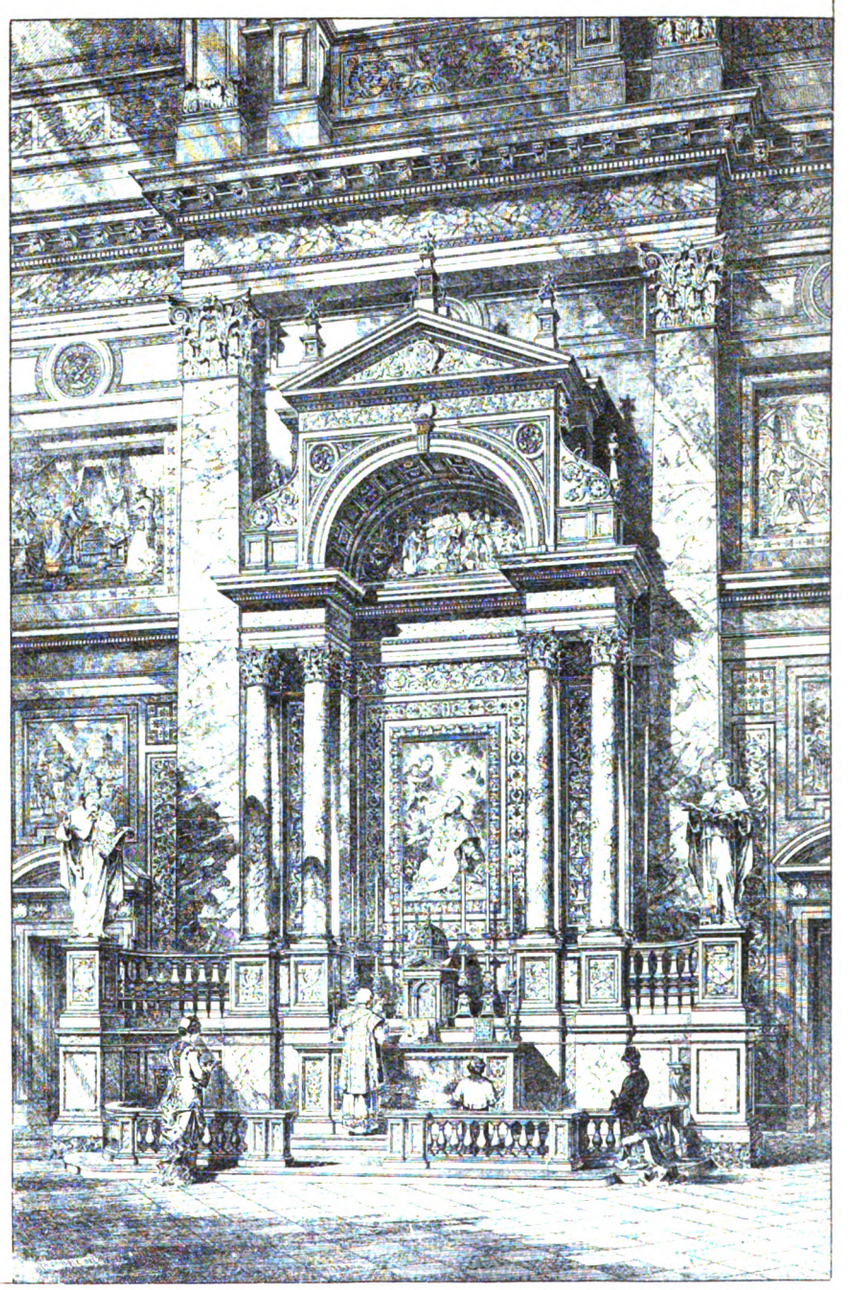

THE ALTAR OF ST. PHILIP NERI: FOR THE NEW ORATORY CHURCH BROMPTON S.W.

DESIGNED FOR HIS GRACE THE DUKE OF NORFOLK: E.M. The Building News.

HERBERT A. GRIBBLE ARCHT

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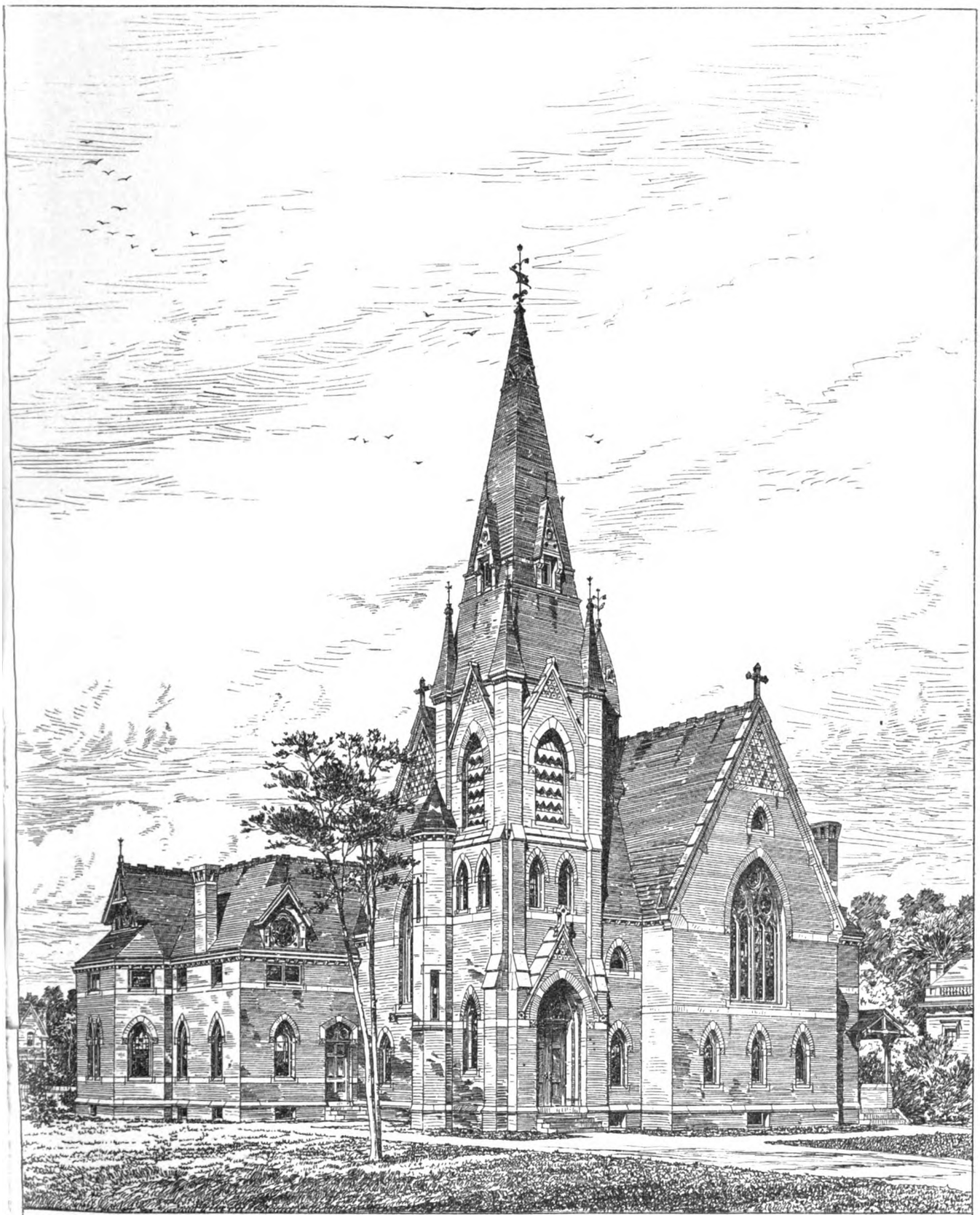

M. E. Church at Lodi N. Y. W. H. Hayes, Architect. Minneapolis. Minn.

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English ecclesiastical structure. Its *vis-à-vis*, the subject of our illustration, though far from being small, and composed of the most rare and valuable marbles, will fail to compete with its opposite neighbor, either in magnitude or magnificence. Its situation is also not so favorable, in consequence of its being surrounded by a number of door-openings, which are of the greatest convenience, and practically indispensable, but at the same time, destroy the tranquility and isolation so desirable in a chapel of this character. This drawback has been overcome in a great measure by the construction of quadrant wings on each side of the altar, which entirely shut off the doors in question, and shelter the worshippers from distraction. The altar-rail is also arranged in such a manner as will contribute to the attainment of this object. The material used for the work is marble, chiefly from Italy, and will include samples of the following: — Bianco Nero, Rosso Antico, Sienna, Cippolino, Languedoc, Verde Antico, Genoa Green, and Rosso Levanto. The principal portion of the superstructure, the statues of St. Gregory and St. Cecilia, and all other portions of bas-relief will be in Carara statuary. The central picture over the retable will be in oil, surrounded by a frame of inlaid marble in three tints, and the subject in the lunette of "St. Philip Building the First Oratory," will be in Venetian mosaic, the cartoon for which will be prepared by a well-known artist in Rome. The two adjoining Corinthian pilasters are in Devon marble the caps of which are embellished by gilding, while the surrounding architecture will be appropriately furnished with historic and other suitable paintings.

PRIVATE DWELLING, PARIS. M. J. FEVRIER, ARCHITECT.

[From *La Semaine des Constructeurs.*]

This hôtel which fronts on the Rues Legendre and Thann, and on the Place Malesherbes, is built of brick, red with lozenge-work of black brick, and stone in the style of Louis XII.

METHODIST EPISCOPAL CHURCH, LODI, N. Y. MR. W. H. HAYES, ARCHITECT, MINNEAPOLIS, MINN.

This church is built of brick, with a finish of light sandstone, and has a corrugated iron ceiling. The total cost of the building was $12,000.

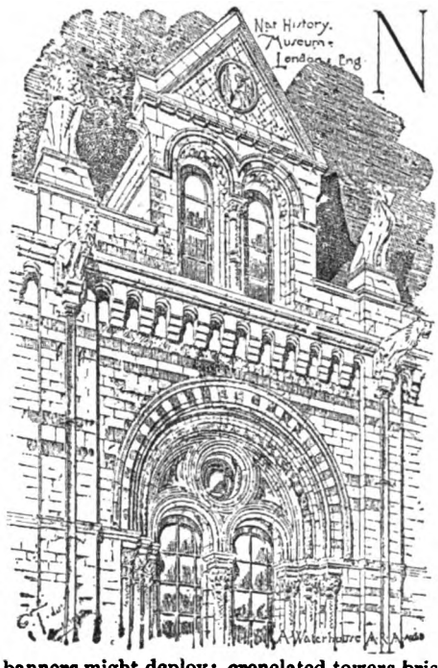
HOUSE FOR J. G. MITCHELL, ESQ. MESSRS. CABOT & CHANDLER, ARCHITECTS, BOSTON, MASS.

BACKWARDNESS OF ARCHITECTURE.

ALTHOUGH in painting and perhaps in sculpture also the United States are improving from year to year, it is astonishing how architecture drags behind. An enormous quantity of building goes on here. Wards spring into being in a few years. Burnt cities rise again before the ruins have done smoking. But the edifices, although sometimes loaded with ornament and constructed of costly materials, are seldom the work of an architect in the true sense of the term as now used — namely, a master of building, as one says master of a fine art. They are the work of masters of mechanical and technical art as opposed to the fine arts. In New York it will be the merest chance if the next public building or costly residence does not fall into the hands of men who are not able even to sensibly "lift" modern European ideas in architecture. For one Jefferson Market Court-House, with its pleasing, though not very original design in elevation and coloring; we have any number of buildings like the post-office, the Metropolitan Museum, the Cathedral in Fifth Avenue, the brownstone Vanderbilt boxes. What frightens one in these buildings is the complacency with which owners and public regard them, and the silence of the press. They have the same vacuousness, the same absence of idea or sentiment for outline, composition, light and shade and color, which startle and disconcert the amateur in an exhibition of pictures at the Academy. Rich men and congregations are seldom able to secure for their large outlays the buildings which can be approved by a cultivated taste: a club might be expected to succeed better. But the recent experience of the Union League shows that a wealthy and ambitious organization, containing a very large proportion of cultivated men and an unusually high average of brains, cannot save itself from grievous and elementary mistakes in architecture. It is evident that in the building committees appointed by the general or State legislatures, congregations and clubs, there is seldom or never a majority competent to select the best architect and get from him work that is worth the money expended.

As things are now managed, an architect of genius has to stultify himself nine times to get a chance in the tenth instance to build something that he really approves of — and who can do this long without degenerating? This fact reflects perfectly the state of the fine arts — nay, perhaps even of the government of the community that built it. Pretentious communities want pretentious buildings. If New York were not misgoverned would we have our present court-house? If Washington were not corrupt, would we have our present post-office? If New York society had any dignity or backbone, would we have millionaires thrusting themselves forward by the mere weight of big houses, big picture-galleries, and lavish decorations, with a cynicism worthy of our legislators? The millionaires would not build palaces in six months, but would employ real architects to build quietly and beautifully, just as they themselves would gradually enter society on their personal merits, not on their money-bags. At Washington some pains would be taken that the great buildings erected by the public funds all over the land were the very best to be procured. Our municipal government would slowly and carefully foster architecture by discouraging hasty work and reckless expenditure of the tax-payer's money. Our clubs and congregations would make it their first business to judge of the qualifications of architects on artistic, not on personal or interested grounds. The main point is that the demand should be a demand of taste. Architects cannot be independent, cannot "educate the public," cannot wait till they are dead for recognition. They depend almost as directly on the public as the actor, and their audience is neither so numerous nor so ready to be pleased with what is set before it. Until the public shall reform, until the press shall begin to call owners and architects to account for vulgar, stupid, and ridiculous work, there is no hope for American architecture. At present it represents the mere brute force of money more than anything else. It shows also restlessness, vagueness of purpose, smattering of foreign styles. No wonder many people prefer the barren monotony of blocks of brick and mortar to the ineffectual efforts of our unhappy architects. And along with as thorough and searching criticism as the press can give, must go, on the side of architects and owners, the most elaborate drawings and models of projected buildings. For, alas! the building once in place is there practically forever. Criticisms are forgotten, and people accustom their eyes to the ugly mass. Then associations give it dignity, and the city is saddled with a dull and pointless building to which the citizens cling with a fervor worthy of a St. Peter's or an Alhambra. — *The Critic.*

ARCHITECTURE IN 1882.



NEVER had it occurred to us to look upon the Royal Institute of British Architects as a body incorporated for the promotion of practical jokes; our eyes are, however, now open to our deficient appreciation of the capacity of that distinguished society when it unbends itself to high jinks. The subject of its principal prize for the present year was a "West-End Club" (1105), and it has crowned Mr. Beresford Pite for a marvellous "labor of an age in piled stones," a castle grim and mediæval, broad spaces of bare wall, mullioned windows, narrow loop-holed openings, porches through which an army with banners might deploy; crenelated towers bristling with conical cappings; altogether the structure in which Beauty might have slept her enchanted sleep, or out of which one of the giants whom Jack the Great quelled might have sallied on his murderous forays. There is of course a reason for all things, and we conclude that Mr. Pite is a gentleman of an ascetic frame of mind, who has learned, during the inquiries into the natural history of clubs by which he drilled himself for his great and successful effort, that the members of these frivolous bodies had the bad habit of wasting their hours in staring from large windows at the men and the women, the carriages and the horses, which throng the streets: so, as a practical apostle of morals, he made it his duty to rebuke and check such unseemly levity on the part of all who might be fortunate enough to pass the ballot of his club. The decision of the Institute was, we conclude, reached in consequence of its leading spirits being at this minute, as loyal Englishmen, much exercised by Irish lawlessness, so that they could only look upon a building for the occupation of single gentlemen as partaking of the nature of a prison for suspects, and we must own that, regarded in the light of a veiled provision for the safe keeping of Irish patriots, Mr. Pite's castle in the air is singularly appropriate. It is a pity that the Government's sudden change of policy should have frustrated such healthful intentions when the man was there to provide a nobler and a more terrific Kilmainham. Mr. Howard Ince's design for the closely affined "Casino or Club for an Inland Watering-Place" (1145), which won the first prize at the Royal Academy, is not so mirth-inspiring. Nevertheless we are unable to see the appropriateness for its object of the somewhat solid composition of Perpendicular and Jacobean, with a

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tower curiously recalling — probably from some accident of drawing — but with attenuated proportions, the tower of the Record Office. If the prizeman and the adjudicators respectively were put under compulsion to produce variants of the design to serve as an inland town-hall and a marine casino, we fancy they would be puzzled as to what features to retain and what to alter. — *Saturday Review.*

THE PRIMARY COLORS.[1]

OF all the interesting phenomena concerning color, resulting from recent scientific researches, probably the hypothesis that red, green and violet are the three primary color sensations attracts most attention, because of its apparent antagonism with the fact that red, yellow and blue are the three primary colors of pigments.

All colors are really sensations, caused by the action of light on one of the divisions of the retina, the so-called layer of rods and cones. It has only recently been discovered, however, by Professor Max Schultz, that both the rods and the cones have each their peculiar function, and though probably both serve as elements of light, it is more especially the function of the rods, whilst the perception of color is due, possibly exclusively, to the cones. These cones appear to be divided into three sets. One set, being stimulated by the strongest vibrations of light, produces the sensation of red; another set, acted upon by the vibrations of medium strength, produces green; and the third set, responding to the short and weak vibrations, produces the sensation of violet. Red, green and violet are therefore termed primary colors. Intermediate vibrations affect two sets of cones simultaneously, and consequently produce compound or secondary colors. Upon the three sets of cones being excited together, in their proper proportions, the sensation of white is the consequence. If this theory be true we may assume the existence of a color-sense wherever we find the cones, and to mark it absent wherever they are absent. A defect in their arrangement probably accounts for color-blindness. It is well known that color-blind persons are usually insensible to the stronger, red-producing vibrations, though cases occur when they are blind to other colors and keenly sensible to the red; indeed, the partially color-blind as a rule appreciate more intensely the colors they are able to perceive than persons possessing the normal sense of color. The number of persons affected more or less with color-blindness is surprising: according to Professor Rood it has been estimated that in England about one person in every eighteen has an imperfect color-sense, though it is remarkable that the affliction is almost exclusively peculiar to the male sex, women being comparatively free from it. Often the color-blind are for years unconscious of their defect, and it is very difficult to demonstrate the fact to them. When we consider the theory of the rods and cones, and are aware that a slight difference in their arrangement causes a proportionate difference of color-perception, and knowing that we are all subject to a slight difference, it would appear probable that each individual is affected by the vibrations of light to a different degree, or, in other words, that possibly no two persons see colors exactly alike.

Color combinations may be demonstrated in different ways. Perhaps the simplest is by employing two lanterns and projecting colored light from both onto a white screen. The two color-discs, when superposed, produce one color, — the sum of the two separate discs. Taking the primary colors, red and green produce the sensation of yellow; red and violet produce pink; green and violet produce greenish-blue.

The resulting colors, yellow, pink, and greenish-blue, are the secondary colors, and it follows that the brightness or lightness of any of these colors must be greater than that of any of the primaries, because of the nearer approach to white caused by the combination: yellow, for instance, will be as bright as the brightness of red and green added together; white will be as bright as the brightness of the three primaries added together.

The different vibrations of which white light consists are capable of producing every possible color sensation, yet we cannot say that all color is due to them alone. Were it not for the power which natural bodies have of selecting their own particular color, or rather color-producing vibrations, the phenomena would be incomplete. No natural body creates color; it simply absorbs a part of the light thrown upon it, and rejects the remainder. It is the portion so rejected, and not that retained, which determines the color.

Intercepting the white beam of light from the lantern by red glass, we prevent the vibrations which produce the sensations of violet, blue, green, and greenish-yellow from passing through. The red glass absorbs all these rays, consequently the red rays alone are left, and we have a red disc on the screen. We will now from our second lantern project a greenish-blue light, this color being as nearly as possible the sum of the colors absorbed by the red medium. By moving the lanterns in order that this color may be, as it were, superposed, or added to the red, we produce white, thus proving that the red glass had absorbed all those rays of which the bluish-green consists, and these rays had only to be given back to reproduce the original white disc. Repeating this experiment, but with blue and yellow lights, white is also produced, and not green, as might be expected from our experience of the result obtained by a mixture of blue and yellow pigments. By passing a beam of light through the blue and yellow glass *together*, placing both colors in the one lantern, green is produced, because the blue and yellow glass are not only transparent to their respective colors, but also to the green, which is contiguous to both; but the blue glass absorbs the yellow and less refrangible rays, and the yellow glass absorbs the blue and more refrangible rays; consequently green is the only color left to pass through both, and therefore when a beam of white light goes through these colors together, green is the only possible result. This is exactly what occurs in the mixture of pigments, and it is through the confounding of the mixture of light and the mixture of pigments that many erroneous conclusions are arrived at.

So far, absorption has been considered in connection with transmitted light: we have now, in order to show its connection with the colors of pigments, to consider it when combined with reflected light. The coloration of pigments, of flowers, of green leaves, indeed of all natural bodies, "is due to the combination of reflection with the phenomenon of absorption."[2] I have here a colorless glass vessel, containing a red solution, and of course it exhibits the same phenomena as colored glass: it requires light either transmitted or reflected to be seen, for when placed in front of the black screen it appears dark and colorless. By placing a white object in the solution we notice that part of the light directed upon it undergoes absorption whilst passing through the fluid, and the portion left is reflected by the object, and passes back again to the eye. This light, therefore, has itself gone twice through the fluid, or double the distance of the object from the front surface of the glass vessel. It is evident that our red color is due to what is called "selective absorption," red being the only color not devoured, as it were, by the fluid. We will now add to the solution some powdered chalk, each particle of which may be regarded as a minute white object reflecting a small quantity of the light not absorbed. All I have said of the one white object applies also to these minute particles. All color pigments are composed of such minute objects mixed with a vehicle which has the power of sifting the white light shed upon them, and selecting certain rays, whilst the particles reflect the remainder. The condition of the petals of flowers and of green leaves is just the same. A white lily, for instance, if it were quite smooth, would have the appearance of thin glass; it is, however, composed of a vast quantity of minute cells, so that it resembles finely-powdered glass, from each little particle of which light is reflected backwards and forwards, and there being nothing in the lily to cause the selection of one ray over another, the light is white. A scarlet geranium is similarly composed, but its particles or cells are infused with colored matter, which absorbs the green and blue rays, and the unabsorbed scarlet is reflected. All green leaves owe their color to the same cause; light passing backwards and forwards through a coloring matter which extinguishes the red rays is received upon the retina as green.

A property of absorption, not only interesting but of some importance to colorists, is the change of hue colors undergo when deepened or lightened. Each additional layer of a colored medium naturally absorbs more of the light not actually destroyed, and therefore deepens the color, until at last it too is altogether extinguished. Light, however, has been shown to consist of vibrations of different degrees of strength. This being the case, the stronger vibrations will continue to act after the weaker are quenched, or, as the color deepens, its hue alters. To explain this more clearly, I will quote from a lecture by Professor Stokes, F. R. S., who, for the sake of simplicity, presupposes two kinds of light, blue and red, having intensities respectively of 100 and 10. "There is, of course, a great predominance of blue over red. Now suppose in passing through a stratum of a certain thickness half the blue light is lost, and only half transmitted, and that 90 per cent of the red light is transmitted, then, after passing through the first stratum, the intensities will be respectively 50 and 9; after passing the second stratum of the same thickness the intensities will be 25 and 8.1; after the third 12.5 and 7.3; after the fourth 6.2 and 6.6, or about equal; but after passing through the next stratum they will be 3.1 and 5.8, so that, although the quantity of red light was so much smaller to begin with, the red is more lasting, and in light which has passed through five of these strata the red now predominates over the blue." I have here a glass vessel containing water; by adding a little red fluid you will perceive it has a blue hue, but by adding still more of the color it assumes a scarlet hue. The cause is evident. At first, the weaker blue vibrations were able to pass through, but when the absorbing liquid became more dense, the stronger red vibrations could only make their way. Conversely with this effect is the result obtained by the addition of white to a color pigment, for in this case the effect should be towards a hue of the more refrangible rays of blue and violet. The diagrams are colored with crimson lake, dark Brunswick green, and Prussian blue. These colors all show a decidedly bluer hue when mixed with white than would have been expected from the pure color.

I have shown that the primary sensations of color — red, green and violet — cannot be produced by the combination of any of the other color rays of white light, but that conversely all the other sensations of color are obtained by these three colors in different pro-

[1] A paper read before the Literary and Philosophical Society of Liverpool, by G. H. Morton, Jr.

[2] Stokes.

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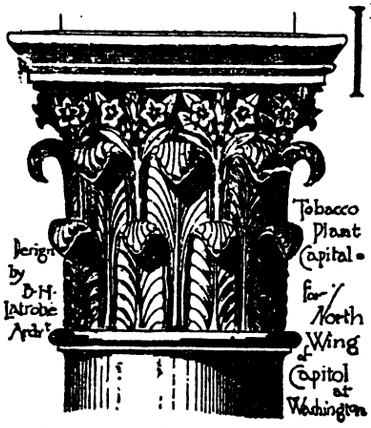
portions. The same may be said of the primary colors of pigments. Red, yellow and blue cannot be produced by the mixture of other color pigments; but these colors are capable of producing by admixture almost all other colors. It will be at once evident that the colors of each set are different, the primary green and violet sensations being substituted by yellow and blue as primary color pigments, and this substitution causes one to inquire whether the remaining primary of light, red, is of the same hue as the primary pigment of that name? It is here desirable to point out the very general idea the names of colors convey to the mind. When we say red, what do we mean? The term red is often applied to a color that may be almost orange on the one side or violet on the other; green, commonly speaking, may be almost yellow or blue; violet may mean almost pink or blue. I consider that there is as much difference in the primary red of the spectrum and the primary red pigment as there is between the green light and the yellow pigment, or between the violet light and the blue pigment.

Now, the primary red of light is a scarlet red; indeed, in some works the term scarlet has been applied to it. The green light is more inclined to yellow than blue, and the violet light is a decided blue violet and has been named blue by some writers. In pigments we find that the primary colors are the reverse of this. The best red pigment for the mixture with the greatest number of other colors is a crimson red; the best yellow is more inclined to orange than blue; the best blue is of a green hue. When these pigment colors are lightened by the addition of white, there is obtained, perhaps as near as it is possible to obtain with pigments, the secondary colors of light. It would thus appear that the colors which were formerly considered primary colors are really the secondary colors of light; and therefore, though red, yellow and blue may be the primary colors of pigments, they are certainly not primary color sensations caused by the vibrations of light.

ARCHITECTS' RESPONSIBILITY FOR MYOPIA.



IN the school-room there are two kinds of influence that work injuriously upon the eyesight. Under the first are classed all those things which compel the eye to strain itself in order to see distinctly small letters or objects; under the second, all those which cause a congestion or rush of blood to the head and eyes. To the first belong bad ventilation and improper light, too small and imperfect type, pale ink, many successive hours at the same kind of work, as in reading, writing, sewing, etc., without change or rest of the eye, all sorts of toil causing the use of the eye until late at night and sometimes with very defective light. To the second belong not only those things just enumerated, but also the construction and arrangement of school desks and benches, which, in many schools, make it next to impossible for pupils to hold their bodies in proper position for any length of time.

In order to demonstrate the role that bad air, bad light, etc., play in the school-room, I extract some pertinent remarks from a paper published by Dr. Loring of New York. He says: "I am, therefore, of the opinion that bad air alone, acting as the primal cause, may set in train a series of morbid processes, which may, and often do, affect not only the working capacity and integrity of the organ, but which may lead even to its total destruction. Thus simple irritation of the mucous membrane of the eye may, and often does, pass into actual inflammation, which, increasing in violence, may proceed from part to part till the entire organ is involved, and thus the sight become impaired or totally lost.

"Ought not the light to fall, not full in the face of the child, but first on the book or work and be reflected into the eye? Before answering this question precisely as it now stands, I should like to premise it by making the general assertion that not only is the direction in which the light comes important, but also its quantity and quality. Reduction in illumination is as a rule precisely equivalent to a reduction in the size of the object: therefore, the less the light the nearer an object must be brought to the eye, and the greater the strain in the act of vision. It is impossible to fix with any scientific exactness just the size that a window should be to give sufficient light for visual purposes, since this must vary with the exposure and surroundings of the room; but it has been reckoned in Germany that for a class-room containing twenty persons there should be at least four to six thousand square inches of glass, which would give to each scholar from 200 to 300 square inches, or what would be represented by a pane of glass from 14 to 17 inches square: such a room as this would be sufficiently lighted in any part. A room 20 feet square should not contain less than 70 to 80 square feet of glass, and it may be laid down as a rule that too much light cannot be obtained in a room, as all excess of glare can be guarded against by artificial shades if properly applied. More light enters the room from the same amount of glass from the south than from the north, and a southern, southeastern or southwestern exposure is better than a northern, northeastern or northwestern, especially for class-rooms, and this, too, simply in regard to the amount of light, and independent of the purifying influences of direct sunlight. That a north room is better for the purposes of the artist is due to other causes and does not affect the general rule.

"The light should not come from directly in front, and especially is this the rule when artificial light is used; for when the light comes from directly in front of the person, the pupil of the eye becomes unduly contracted, which is equivalent to reducing the quantity of light, since less light enters the eye from the object viewed, while the eye is exposed to too much light reflected from the surrounding objects, and from the direct rays from the source of illumination. Neither should the light come from directly behind, as the object then lies in the shadow of the body. Nor yet from the right side, because in writing the shadow of the hand falls across the page, and a moving shadow over a lighted surface not only reduces the quantity of light and leads to a stooping position, but it is also more annoying to the eye than a uniform reduction in the illumination of even a greater degree." The best direction for the light to come from is the left-hand side, and from rather above than below the level of the head. Windows, therefore, should not be run down too near to the floor, as they often are in class-rooms and offices. I do not agree with the opinion often expressed, that the best light is that coming from directly above. I cannot refrain from adding, in this connection, the conclusion founded on Dr. Cohn's elaborate investigations in regard to nearsightedness among school children in Germany. He thus formulates it: "The narrower the street in which the school-house was built, the higher the opposite buildings, and the lower the story occupied by the class, the greater the number of nearsighted scholars." I should, then, from these considerations, say that the angle at which the light strikes the eye is important. — *Extract from a Report issued by the Dept. of Education.*

THE RECENT BUILDING ACCIDENT AT ST. LOUIS.

ST. LOUIS, July 15, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — In a late number of your paper you quote from the *Scientific American* a brief item about the fall of the Krafft, Holmes & Co. building in this city last spring. There were two investigations into the causes of this disaster, both directed by architects, and instituted by the owners of the building on one side and by the suddenly ejected tenants on the other side, beside the regular official "inquest" of the city building inspector, and considerable volunteer examination by reporters and builders and architects from this and other cities. The result of it all is that the matter remains as much an inexplicable mystery from any recognized scientific standpoint as the falling of the walls of Jericho.

The volunteer theorizers ascribed the accident to various causes. One was "positive" that it was due to the use of old and new bricks in the same wall. Another had seen a crack in a part of the wall weeks beforehand and had predicted the catastrophe. Another thought there must have been an explosion of some kind, although there was nothing explosive in the stock of groceries, and no one had heard the report.

But one of the professional investigating committees published a detailed report. They showed by a few brief calculations that the supports of the upper floors and the floors themselves, by the accepted rules for determining the strength of materials, were adapted to a load several times greater than the slender brick piers in the cellar on which the whole fabric above rested. Under the portion which fell these brick piers were crushed to minute atoms,—almost to powder. The piers were apparently annihilated in an instant, and the floors dropped into the void pulling the outer wall in upon themselves.

But this committee forbore to declare that the weakness of these piers was the cause of the accident, although so insufficient in strength. Had the whole building fallen their way would have been clear, but more than half of the building remained erect and unharmed, as perfect apparently as when first built; and as this part was to all appearance just as heavily loaded as the part which fell, and as it rested on slender brick piers precisely similar to those which had been crushed, as far as the committee could determine, there was a natural hesitancy in pronouncing upon the true cause of the disaster.

This hesitancy has been shared by all thoughtful persons who have discussed the matter after all the facts obtainable had been published. According to the recognized data of sound construction the interior supports were barely able to sustain the empty floors, and, as was to be expected, the front half collapsed without warning one still night when only a comparatively light stock of goods had been placed on them.

But the rear portion of the same store, which Messrs. Krafft, Holmes & Co. state was loaded more heavily if anything than the front portion, and which rested on the same insufficient supports below, chose to set at defiance the rules of construction by which cautious architects build, and, contrary to all reasonable expectation, stood firm, stiff, level and true, carrying its load of goods and apparently unshaken by the shock which the fall of the front portion must have caused. The building was six stories high.

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It may be remarked in conclusion that in the rebuilding of the fallen portion care has been taken to remove all brick piers throughout, and to substitute stone in their place. Evidently the owners, and the architect who was employed to rebuild, were mistrustful as to how long this rear part might be disposed to manifest defiance of scientific rules by standing firm upon an insufficient support. In the original construction the plans were furnished by a carpenter and builder, no architect having been employed. C. E. Illsley.

AN UNDECIDED COMPETITION.

Bridgeport, Conn., July 24, 1882.

To the Editors of the American Architect: —

Gentlemen, — About three months ago plans were submitted by us and, we presume, by many other architects, in answer to advertisement in your journal by Board of Education of Cleveland, Ohio; but up to present time we have heard nothing more of it and have been unable to learn of decision and award, although we have written to the Clerk of the Board several times. Can you or any of your readers enlighten us on the subject, and oblige us and

Several Competitors.

NOTES AND CLIPPINGS.

Cairo. — The citadel of Cairo stands on a steep, rocky bluff above the city, the relative positions of the two being very much those of the Capitol and the lower town at Washington. It was the favorite residence of the famous Egyptian dictator of the last generation, Mehemet Ali Pacha, who strongly fortified it and kept a number of heavy cannon constantly pointed from its walls at the city below, to overawe the disaffection which his iron rule inevitably produced. The walls are still in tolerable repair, and might give some trouble to a force unprovided with heavy siege artillery. Above the ramparts are visible at a considerable distance the tall, slender, white minarets of the Muhammedieh Mosque, built by Mehemet Ali. This is one of the principal ornaments of Cairo, its interior being decorated with a richness of coloring unmatched in the world, except, perhaps, by the Alhambra Palace at Grenada. In front of the main entrance lies a vast paved quadrangle surrounded by a low colonnade, which has acquired a tragic historical renown as the scene of the famous "massacre of the Mamelukes" by order of the pacha. Mehemet, finding in the turbulent independence of these warlike chiefs a formidable obstacle to his cherished scheme of absolute power, invited them to a banquet in the courtyard of the citadel. They rashly accepted the treacherous courtesy, and were suddenly fired upon in the midst of their revel by a detachment of soldiers concealed in the encircling colonnade. All perished save one, the son of the principal chief, who, alone preserving his presence of mind, threw himself upon the ground and succeeded in reaching his horse, which was tied to an adjoining pillar. Springing upon its back, he cut his way through the swarming assailants, and, finding the gates shut against him, took a flying leap from the top of the wall, a height of eighty feet. The horse was killed on the spot, but the daring Mameluke, escaping with a broken limb, crawled away and hid himself before he could be overtaken. — *Exchange.*

Spontaneous Combustion of Lamp-Black. — Fires occurring from spontaneous ignition of vegetable black are very common. Oily rags are most liable to self-ignition during the summer, after a continuance of dry, warm weather. A sudden storm or a shower of rain appears to give life, as it were, to the parched-up matter, and a fire is the result. It has been also noticed that the reverse occurs after a continuance of wet weather. A few days sometimes are sufficient to set up active and rapid combustion, especially among sweepings in paint and oil stores, consisting generally of wood dust, dried vegetable and animal powder-colors more or less saturated with varnish, turpentine, oils, etc. Lamp-black, if packed in a leaky cask when freshly prepared, condenses the atmospheric gases on its surface, which, owing to the porous nature of the substance, is very large in proportion to its weight. In condensation the gases give out a certain amount of heat, which, under favorable circumstances, is sufficient to cause the ignition of some inflammable substance accidentally present, which, by combining with the condensed oxygen, liberates heat enough to cause the ignition of the vegetable black, which, when once started, soon spreads until the contents of the cask become red-hot. This spontaneous ignition is not infrequent in many large carriage factories, and builders' shops have been destroyed solely from this cause. So well is it known now that various devices are adopted to obviate the chances of a disaster. The large firm of Wilkinson, Hayward & Co., London, pack the lamp-black in half-pound packets, done up in brown paper, and then packed in casks. To put it in printed paper would insure ignition, from the absorption of the oil in the printing ink by the lamp-black, generating gas which would soon ignite the soot or lamp-black. One among many instances of well-attested cases of spontaneous ignition occurred at a large carriage works at Grantham, England, in a shop far away from fire, or the chances of a spark. The paint shop was gradually illuminated on a mild summer's evening during daylight. It was noticed through the work-shop windows, and seen to be a tub of loose lamp-black consuming the cask. It was easily carried out onto the grass to finish its work. It was thought that, being near the grinding-paint stone, some oil had been splashed into it, or an oily rag had been dropped into the lamp-black. The secret was soon found out by the pallet-knife being found among the ashes of the cask, having been carelessly dropped in with some wet paint on it; or even without any wet paint; the dry, oily paint which accumulates on the blade, near the handle, would be sufficient to cause ignition. It is not the large quantity of oil, but the small quantity, which is the cause of it. This is so well known that some coach-makers, when they receive lamp-black, put it into a sound cask, and pour enough linseed oil into it to saturate the whole. — *The English Mechanic.*

The Sale of Baron Grant's Mansion. — The New York *Times* says that "in the proposed method of sale of Baron Grant's mansion at Kensington is something new. It is to be an absolute dispersion. It is not to be sold in block, but in fragments. As it was raised in a fairy-like manner, Aladdin-wise, it is to depart and disappear off the earth's surface in an equally magical way. It was a house symbolic of that prodigality which comes from stock jobbery, and possibly it is not the only type of this particular style the world has seen. Within its walls are 52 richly carved and sculptured pieces of statuary and marble mantelpieces. There are two grand marble staircases, with marble landings, caryatides in flocks, countless Corinthian columns (designated per catalogue as "noble"), 10,000 feet of marble flooring and dados, 70 squares of oak wainscot and parquetry flooring, 18 baths, and innumerable lamps on granite plinths. Everything is offered for sale bit by bit, and objects are specially described as being parts of the ball-room, the Swiss châlet, picture-gallery, blue and yellow drawing-rooms, lobby, ladies' morning-rooms, cloak-rooms, billiard-rooms, library, and banqueting halls. Had that greatest of all English auctioneers, Robins, been alive, he who bid off Strawberry Hill, what a gorgeously grandiloquent advertisement would have been forthcoming! There is, however, a consolation to both the builder and the public in this method of annihilation. The chagrin of the first must diminish, for no single stone indicative of his folly can remain, and as to the public, the moral is taught that riches dishonestly gained are rarely lasting. It is by no means impossible that this English method of sale will find its adapters in this country, for history always repeats itself." A later issue further states that the "two marble staircases, with their lower landings supported by caryatides representing the seasons, and for which a few years ago he is declared to have paid $55,000, sold at the auction for $5,000, and the purchaser of them was Mme. Tussaud! Further items in the sale are given as follows: Four pairs of Italian marble fluted Corinthian columns in the hall, which cost $5,000 per pair, sold for $500 per pair; the marble terrace at the rear of the mansion sold for $685; the marble inlaid flooring of the hall realized $375; the four pairs of fluted Italian marble Corinthian columns in the ball-room, which the auctioneer stated cost $5,000 per pair, sold for $600 per pair. Among other good prices obtained were $210 for the conservatory; $350 for the parqueted flooring of the ball-room, and $200 for the ornamental cast-iron grating round the room; $105 for an antique marble chimney-piece; $305 for the parqueted flooring, and $145 for the cast-iron grating round the picture-gallery; $250 for a handsome statuary marble chimney-piece in the blue drawing-room, and $310 for a similar chimney-piece in the yellow drawing-room. The total proceeds of the day's sale amounted to $17,500, which, with the sum received from the previous day's sale, brings the sum already received up to $30,000. As only two more days remained for the sale, the total proceeds are not likely to give more than a bagatelle of what these portions of the colossal mansion originally cost."

A Self-winding Clock. — At the Paris Exhibition of 1878, Mr. A. Dardenne, a Belgian, exhibited the model of a self-winding clock, which has since been improved in such a manner as to merit further notice. A specimen clock was fixed at the Gare du Nord Terminus, Brussels, last September, and after six months' trial it was found to agree exactly with the Observatory clock, not having varied in the least during that time. The clock is wound by a small wind-mill, which is placed in a ventilation pipe, chimney, or any other place where a tolerably constant current of air can be relied on. This wind-mill is, by a reversed train of multiplying wheels, continually drawing over a wheel an endless chain, in one loop of which the clock-weight is supported. As the loop hangs between the clock and the winding-machine, the weight is continually drawing through the clock the slack chain drawn up by the wind motor, and thus a constant motion is maintained. A ratchet wheel prevents the motor from turning the wrong way, and, by a simple arrangement, whenever the weight is wound right up to the top, the motion is checked by a friction brake automatically applied to the driving mechanism. When the weight is thus raised to the top, sufficient energy is stored to insure the proper working of the clock for about twenty-four hours, and it will therefore be seen that a perfectly regular current of air is not essential. It is said that Mr. Dardenne is now supplying these clocks for domestic purposes, and their freedom from disturbance and ease of management are arguments in favor of their adoption. — *Journal of the Society of Arts.*

Pompey's Pillar. — Although Alexandria has lost her obelisk she still retains another monument of almost equal historical value, though inferior antiquity, for which many a scientist must be trembling at this moment. Quitting Alexandria by the eastern gate, you see before you on a low rising ground a tall, slender column of red granite, 95 feet in height, of a form and finish unmistakably Grecian. This is the far-famed "Pompey's Pillar" of European guide-books, which give many ingeniously erroneous explanations of its peculiar name. In reality it seems to have had no connection with Cæsar's ill-fated rival beyond the somewhat remote one of his having been murdered near the spot. Professor Kingsley was probably right in asserting it to be the sole survivor of the 400 columns of the Serapeion, or great Temple of Serapis. It is an object of curiosity with tourists of all lands, and Arab peddlers are always hovering around it with "authentic" fragments of granite from its base, enough of which have been sold, not merely to make another column of equal size, but to build the whole Serapeion over again. Some years ago a party of roystering British Blue-jackets from a man-of war in the harbor conceived the idea of celebrating the anniversary of Trafalgar by scaling the pillar and emptying a can of grog on its top in honor of Admiral Nelson. They accomplished their purpose by means of a large kite with a rope attached to it, and having enjoyed their aerial picnic for more than an hour, descended safely amid the shouts of several thousand Arabs, who had assembled to witness the feat. — *New York Times.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

260,738. KITCHEN-RANGE HOT-WATER RESERVOIR. — Edward Bourne, Allegheny, Pa.

260,743. TAP-WRENCH. — Malcolm Campbell, Holyoke, Mass.

260,755. ADJUSTABLE PITCH-BOARD FOR SQUARES. — Chas. W. Hovis, Clintonville, Pa.

260,771. MONKEY-WRENCH. — Charles H. Miller, Erie, Pa.

260,777. PIPE-VISE. — Thomas Patton, Chicago, Ill.

260,793. DRAINAGE-APPARATUS. — Chas. Shinkle, Covington, Ky.

260,794. AUTOMATIC GATE-OPENER FOR ELEVATORS. — John F. S. Smith, Chicago, Ill.

260,795. SCREW. — Levi Smith, Tidioute, Pa.

260,803. ARTESIAN VACUUM-WELL. — David H. Tichenor, Newark, N. J.

260,816. DIP-TRAY FOR WATER-CLOSETS. — Frederick Adee, Brooklyn, N. Y.

260,872. SHINGLING-BRACKET. — Luther C. Jaques, Rock Rapids, Io.

260,873. SASH. — George H. Johnson, Bridgeport, Conn.

260,878-879. FIRE-ANNIHILATOR. — Isidor Kitsee, Cincinnati, O.

260,934. LATCH. — John Brownlee, Evansville, Ind.

260,952. FLUSHING-VALVE. — John Demarest, New York, N. Y.

260,953. WATER-CLOSET. — John Demarest, New York, N. Y.

260,965. WATER-CLOSET. — Joseph J. B. Frey, New York, N. Y.

260,966. PLUMBER'S COUPLING FOR THE BOWLS OF WATER-CLOSETS. — Joseph J. B. Frey, New York, N. Y.

260,967. SLOP-SAFE FOR WATER-CLOSETS. — Joseph J. B. Frey, New York, N. Y.

260,973. COMPOUND FOR GRAINING WOOD. — John T. Greenwood, Jr., Beloit, Wis.

260,993. FIRE-EXTINGUISHER. — Isidor Kitsee, Cincinnati, O.

260,997. AUGER. — Solomon Kuhlman, Canton, O.

260,998. AUTOMATIC FIRE-EXTINGUISHER AND ALARM. — Clemens Kupka, Phillipsburg, N. J.

261,002. FIRE-ESCAPE. — Henry A. Lee, New York, N. Y.

261,064. FIRE-ESCAPE. — Andrew Swanson, New York, N. Y.

261,075. FIRE-ESCAPE. — Sarah Toner Barr, Washington, D. C.

261,080. SEWER AND MEANS FOR FACILITATING THE DISCHARGE OF SEWAGE. — John Comstock, Hudson, Wis.

261,101. SAFETY DEVICE FOR ELEVATORS. — Cassius C. Palmer, Oakland, Cal.

261,119. WATER-FILTER. — Samuel Adams, Milwaukee, Wis.

261,121. FIRE-ESCAPE. — Francis A. A'Neals, Topeka, Kan.

261,133. ELEVATOR-HATCHWAY GUARD. — Joseph Byers, Newton, and George Taylor, Everett, Mass.

261,137. FIRE-ESCAPE. — Gustave J. Crikelair, New York, N. Y.

261,150. HINGE. — Jas. E. Gowen, Peabody, Kan.

261,155. STOP-COCK INJECTOR FOR WATER-CLOSETS, ETC. — William L. Horne, Meriden, Conn.

261,158. FIRE-ESCAPE LADDER. — Frank G. Johnson, Brooklyn, N. Y.

261,202. CEILING. — James Budd, Boston, Mass.

261,217. PIPE-WRENCH. — Albert F. Fifield, Farmington, N. H.

261,221. ADJUSTABLE BLOWER FOR FIREPLACES AND STOVES. — Geo. W. Geissenhainer, Pittsburg, Pa.

261,227. DWELLING. — Benjamin R. Hawley, Chicago, Ill.

261,238. FIRE-ANNIHILATOR. — Isidor Kitsee, Cincinnati, O.

261,267. HEATING AND DRYING APPARATUS FOR LAUNDRIES. — Chester L. Smith, Norristown, Pa.

261,286. ELEVATOR-SHAFT. — Samuel W. Willard, West De Pere, Wis.

261,291. VENTILATOR FOR WINDOWS. — Samuel K. Addoms, Brooklyn, N. Y.

261,338. HAMMER. — Christopher J. Grellner, St. Louis, Mo.

261,358. WATER-CLOSET MECHANISM. — David S. Keith, Toronto, Ontario, Can.

261,382. INSIDE WINDOW-BLIND. — Robert Pisak, Cleveland, O.

261,398. CHIMNEY-TOP. — Lewis C. Smith, Berlin, Wis.

261,404. VENTILATOR. — Alexander B. Summers, Brooklyn, N. Y.

261,451. DEVICE FOR VENTILATING SOIL-PIPES. — John D. Harrington, Auburn, N. Y.

261,475. FIRE-EXTINGUISHING AND ALARM APPARATUS. — Wm. Neracher, Cleveland, O.

261,486. PIPE-WRENCH. — John E. Sanders, Indianapolis, Ind.

261,487. DOOR-BALANCE. — William F. Sexton, Sr., and Wm. F. Sexton, Jr., Toronto, Ontario, Can.

SUMMARY OF THE WEEK.

Baltimore.

DWELLING. — Mr. Chas. Rous, n w cor. Biddle and Calvert Sts., 22′ x 85′, to be built of brick, with stone finish, three-st'y and an attic; probable cost, $20,000; Messrs. Smith & Bros., builders; Messrs. J. A. and W. T. Wilson, architects.

BUILDING PERMITS. — Since our last report nineteen permits have been granted, of which the more important are as follows: —

L. H. Robinson, 15 three-st'y brick buildings, Barclay St., between Lanvale and Townsend Sts.

L. H. Robinson, 5 three-st'y brick buildings, Lanvale St., between Greenmount Ave. and Barclay St.

L. H. Robinson, 10 two-st'y brick buildings, Carter Alley, between Lanvale and Townsend Sts.

A. T. Abrams, 2 three-st'y brick buildings, Broadway, commencing at s w cor. of Miller St.

Julius Hines, one-st'y brick building, in rear of s e cor. Gay and Exeter Sts.

Johns Hopkins Estate, two-st'y brick building, Gellingham Alley, between Sharp and Howard Sts.

Geo. C. Herchman, 6 two-st'y brick buildings, Madeira Court, between Choptauk St. and Madeira Alley.

F. H. Seidlich, two-st'y brick stable, Raborg St., w of Arch St.

T. R. Sherwood, three-st'y brick building, Chester St., n of Baltimore St.

John Butler, two-st'y brick building, Marshall St., between Winder and Wells Sts.

John Parks, two-st'y brick building, Marshall St., between Winder & Wells Sts.

Geo. L. Krebs, 2 two-st'y brick buildings, Dallas St., between Fayette and Mulliken Sts.

Chas. W. Rockafeller, 8 three-st'y brick buildings, Mount St., beginning at the s w cor. of Presstmann St.

Chas. W. Rockafeller, 5 three-st'y brick buildings, Presstman St., beginning at the s e cor. of Bruce Alley.

Brooklyn.

BUILDING PERMITS. — *St. John's Pl.*, n s, 224′ 7″ e Sixth Ave., 2 three-st'y brownstone dwells.; cost, each, $10,000; owner, architect and builder, Thomas Green, 195 Sixth Ave.

North Twelfth St., s w cor. Second St., one-st'y frame glass-works; cost, $3,750; owner, Francis Storm, on premises; architect, E. E. Gaylor; builder, J. Monzani.

Pulaski St., s s, 400′ w Marcy Ave, 7 two-st'y frame dwells.; cost, each, $3,000; owner, architect and builder, Daniel B. Norris, 359 Clifton Pl.

Grand Ave., n e cor. Lefferts Pl., brick church; cost, $38,000; owners, Trustees First Universalist Soc.; architect, L. B. Valk; builders, J. M. Brown & ——McRae.

Floyd St., s s, 175′ e Sumner Ave., 3 three-st'y frame tenements; cost, each, $1,500; owner and mason, Geo. Straub, 315 Floyd St.; carpenter, J. Rueger.

Central Ave., e s, 70′ s Jefferson St., 2 three-st'y brick tenements; cost, each, $5,000; owner, Leonard Eppig, Central Ave. and George St.; architect, J. Platte; builder, H. Zwing.

Grand St., n e cor. Seventh St., three-st'y brick building for business purposes and halls above; cost, $25,000; owners, Messrs. Higgins Bros., on premises; architect, E. F. Gaylor; mason, M. Smith.

Sterling Pl., s s, 104′ 7″ e Sixth Ave., 6 four-st'y brownstone tenements; cost, each $4,500; owner, architect and builder, G. W. Brown, 728 Fulton St.

Nevins St., s w cor. Sackett St., one-st'y brick gas-house; cost, $16,000; owner, Fulton Municipal Gas Co., 342 Fulton St.; architect, J. F. Harrison; builder, R. Deeves.

Greenpoint Ave., s s cor. Jewell St., three-st'y frame factory; cost, $5,000; owners, Young & Gerard, 153 Manhattan Ave.; architect, G. H. Gerard; builder, Thos. Davis.

Norman Ave., s e cor. Lorimer St., 3 two-st'y and basement frame dwells.; cost, $10,300; owner, W. F. Corwish, 55 Greenpoint Ave.; architect, Frederick Weber; builders, I. & J. Van River and Stephen M. Randall.

Ninth St., s w cor. Eighth Ave., 10 three-st'y brownstone flats; cost, $5,000 each; owner, Daniel Doody, cor. Fifth Ave. and Prospect St.

Fulton St., No. 518, three-st'y sandstone store; cost, $12,000; owners, Wm. Berris's Sons, 526 Fulton St.; architect, R. B. Eastman; builders, James Ashfield & Son and Morris & Selover.

Boston.

HOUSES. — Messrs. Allen & Kenway of Boston are architects of 2 houses for Mr. J. J. French and Mrs. Stratton, on Commonwealth Ave. They are to be built of brick, with stone finish, measuring 26′ x 65′ each, four-st'y; J. Smith, mason, and Leander Greely, carpenter.

STABLES. — Extensive alterations are being made to the Riverside Club stable, on Chestnut St.; Messrs. Rotch & Tilden, architects.

BUILDING PERMITS. — *Brick.* — *Bedford St., Nos.* 57-63, *and* 51-63 *Kingston St.*, Ward 10, for Fred. S. Ames, six-st'y mercantile, 80′ x 158′ and 226′; Messrs. Norcross Bros., builders.

West Fourth St., cor. D St., Ward 13, for John P. Mullen, three-st'y dwell., 20′ x 38′ 4″; John P. Mullen, builder.

West Fourth St., Nos. 303-303½, 2 three-st'y dwells., 20′ x 38′ 4″; John P. Mullen, builder.

Lenox St., No. 92, Ward 19, for Union Carpet Co., manufactory, 20′ x 80′; J. W. Clark, builder.

Wood. — *Marginal St.*, near Jeffries St., Ward 2, for Simpson Dry Dock Corp., storage, 20′ x 65′; Wm. C. Chick, builder.

Beaumont St., near Carruth St., Ward 24, for Annie F. Carruth, two-st'y dwell., 27′ x 39′; Haddock & Son, builders.

East Ninth St., near Douglass St., Ward 14, 2 two-st'y dwells., 20′ x 32′, for Geo. Martin; John Bertram, builder.

Florence St., n s, near Poplar St., Ward 23, for Edwin Coleman, dwell., 22′ x 96′ 6″; Alexander Rogers, builder.

L St., near East Fourth St., Ward 14, for Christopher Blacke, 2 two-st'y and mansard dwells., 17′ x 28′; Clark & Lee, builders.

Park St., near Millett St., Ward 24, for Rodney W. Greenleaf, two-st'y dwell., 17′ 6″ x 46′; N. F. Berry, builder.

Washington St., rear of, near Keyes St., Ward 23, for M. Denman Ross, mercantile, 100′ x 210′; Wm. Carpenter, builder.

Pratt St., near Linden St., Ward 25, for David Bramer, two-st'y hip dwell., 22′ x 28′; D. F. Cameron, builder.

Chicago.

OFFICE-BUILDINGS. — Messrs. Mortimer & Tappen have plans nearly completed for a large eight-st'y office-building on La Salle St., between Monroe and Adams St., to cost $125,000.

Chas. Counselman will also build an eight-st'y office-building, on the n w cor. of La Salle and Jackson Sts.

Burnham & Root are the architects for both these buildings.

BUILDING PERMITS. — Derby & Pond, brick basement, 24′ x 51′, 71 McGregor St.; cost, $2,600.

F. Petersdorf, two-st'y brick store and dwell., 21′ x 52′, 330 Hurlbut St.; cost, $3,000.

Henry M. Gurn, two-st'y brick dwell., 41′ x 45′, Osborne St., near Ohio St.; cost, $4,600.

Thomas Morris, two-st'y and basement brick store and dwell., 25′ x 33′, 252 Ogden St.; cost, $3,000.

M. Sullivan, two-st'y and basement brick dwell., 20′ x 42′, 237 Oak St.; cost $5,000.

H. T. Mullen, two-st'y and basement brick dwell., 20′ x 48′, 235 Oak St.; cost, $6,000.

A. Blake, three st'y brick flats, 25′ x 65′, 628 W. Monroe St.; cost $7,000.

John Studebaker, 5 two-st'y and basement brick dwells., 40′ x 102′, 693 to 697 Sedgwick St.; cost, $16,000.

E. Grom, three-st'y and basement brick store and dwell., 24′ x 65′, 909 Milwaukee Ave.; cost, $5,500.

G. Strobach, two-st'y and basement brick dwell., 19′ x 45′, 51 Hobbie St.; cost, $3,000.

W. A. Williams, two-st'y brick dwell., 22′ x 48′, 18 Lincoln St.; cost, $3,400.

Holsten, Stolhaske & Thurabon, three one-st'y brick cottages, 20′ x 40′ each, 3534 to 3542 Marshfield Ave.; cost, $2,800.

Vac. Jachimstal, two-st'y and basement brick dwell., 21′ x 60′, 401 Twenty-sixth St.; cost, $4,600.

H. Copeland, 3 two-st'y and basement brick stores and flats, 32′ x 50′, 933 West Madison St.; cost, $5,500.

Mrs. E. L. Carswell, three-st'y and basement flats, 25′ x 45′, n w cor. LaSalle and Erie Sts.; cost, $5,000.

A. P. Larson, three-st'y brick flats, 43′ x 47′, 391-393 West Huron St.; cost, $6,000.

A. O. Slaughter, six-st'y and basement brick warehouse, 40′ x 160′, Wabash Ave., n of Congress St.; cost, $55,000.

Jacob Kramer, three-st'y and basement brick dwell., 45′ x 67′, 513 and 515 Congress St.; cost, $7,000.

E. Jennings & Co., six-st'y brick stores and factory, 89′ x 100′, 399 to 405 West Madison St.; cost, $35,000.

D. W. Potter, three-st'y and basement brick flats, 50′ x 67′, 849 to 853 West Madison St.; cost, $18,000.

N. C. King, two-st'y brick flats, 24′ x 50′, 1042 Wilcox Ave.; cost, $4,000.

W. C. Willing, three-st'y and basement brick flats, 24′ x 80′, 873 West Madison St.; cost, $7,000.

Otto Westerholm, two-st'y and basement brick store and dwell., 20′ x 40′, Milwaukee Ave. and Clinton Sts; cost, $2,500.

Conrad Dewitz, two-st'y brick dwell., 21′ x 52′, 3423 Dearborn St.; cost, $4,000.

Owen F. Aldis, three st'y brick dwell., 20′ x 43′, 24 Walton Pl.; cost, $6,000.

Samuel Johnston, three-st'y and basement brick stores and flats, 70′ x 70′, 551 and 553 Blue Island Ave.; cost, $25,000.

Cincinnati.

STRIKE. — The boiler-makers who have been out on a strike for the past six weeks returned to work on the 17th inst., at an advance of ten per cent over former wages.

WORK-HOUSE. — Mr. Henry Bevis has prepared plans for an addition of a new dining-room and hospital to the Cincinnati work-house The different contracts were awarded on the 18th inst.; total cost, $15,000.

HOUSES. — Mr. Geo. W. Rapp is preparing plans for remodelling residence of Lewis Manns, on Laurel St., to cost $4,000.

Also a residence for Dr. J. W. Gradon, on Kemper Lane, Walnut Hills; cost, $10,000.

FLATS. — Messrs. G. & H. Muhlhauser have commenced a five-st'y building, 50′ x 90′, n w cor. of Court and Main Sts., to be used for stores and flats; cost, $40,000; Geo. W. Rapp, architect.

FACTORY. — The Butcher's Melting Association are to build a brick building, 60′ x 100′, at n w cor. of Findlay St. and Central Ave., from plans prepared by Geo. W. Rapp.

ADDITION. — Dr. N. B. Wolffe is to build addition to his residence, No. 160 John St.; cost, $3,000; Chas. Crapsey, architect.

ALTERATION. — Dr. T. A. Reamy is to remodel building, n e cor. of Fourth St. and Central Ave., for suit of offices; cost, $4,500; Chas. Crapsey, architect.

BUILDING PERMITS. — Since our last report the following permits have been issued: —

Harris & Co., Sixth Presbyterian Church, Eastern Ave., near Woodburn St.; cost, $9,000.

Henry Geutramp, 2 three-st'y brick dwells., Race St., near Fifteenth St.; cost, $7,000.

Ben Thalans, three-st'y brick dwell., Longworth St., near Mound St.; cost, $5,000.

Mr. Waitz, 2 three-st'y brick dwells., Linn St., near Court St.; cost, $4,600.

R. Antenreith, three-st'y brick dwell., Poplar St., near Western Ave.; cost, $4,500.

Russell, Morgan & Co., six-st'y brick dwell., cor. of Sixth St. and Eggleston Ave.; Henry Bevis, architect; cost, $60,000.

James Anderson, 2 four-st'y brick dwells., Race St., near Fifteenth St.; cost, $10,000.

Dr. W. G. Orr, two-st'y brick dwell., Woodburn Ave., near Clay St.; cost, $5,000.

L. Burchardt, 2 two-st'y brick dwells., n w cor. Auburn Ave. and McMillan St.; cost, $10,000; J. W. McLaughlin, architect.

J. Weist, three-st'y brick dwell., Western Ave., near Liberty St.; cost, $5,000.

Wm. Boedemer, three-st'y brick dwell., Findlay St., near Freeman St.; cost, $6,000; G. W. Rapp, architect

Geo. Koch, three-st'y brick dwell., No. 76 Harrison Pike; cost, $5,000.

Nine permits for repairs; cost, $4,200.

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New York.

Building Operations. — There is comparatively nothing new being started in the way of fresh building projects, and the architects generally are taking things easy during the "dog days." In regard to fall work there is a strong feeling that an unprecedented amount of work will be started before winter, and there is every indication of a very strong real estate market.

Building Permits. — *West Twenty-ninth St., Nos. 204 and 206*, two-st'y brick stable: cost, about $9,000; owner, Joseph Merklen, 213 West Fifty-eighth St.; architect, E. E. Raht; builders, Jacob Vix & Son and Meeker & Hedden

Forsyth St., Nos. 79 and 81, three-st'y brick store and stable; cost, $9,000; owners, Lord & Taylor, Grand St., cor. Chrystie St.; builder, Wm. Sternkopf.

First Ave., No. 1331, four-st'y brick tenement; cost, $9,000; owner, George Nuse, 756 Second Ave.; architect, Wm. Graul; builders, J. & J. G. Schmeckenbecker.

Fifth Ave., s e cor. Twenty-eighth St., eleven-st'y brick apartment-house, stone and terra-cotta trimmings; cost, $428,000; owner, Knickerbocker Apartment Co., R. S. Hone, President, 153 Broadway; architect, C. W. Clinton; builder, D. H. King, Jr.

Ninth Ave., n w cor. One Hundred and Twenty-sixth St., 4 four-st'y brick tenements; cost, each, $12,000; owner, David Mulrein, 317 West One Hundred and Twenty-fifth St.; architect, R. Rosenstock.

Sixtieth St., n s, 175' w Tenth Ave., 2 five st y brownstone tenements; cost, each, $15,000; owner, Julia Mullaly, 336 West Fifty-ninth St.; architect, C. F. Ridder, Jr.; builder, not selected.

Boulevard, w s, 60' s One Hundred and Eleventh St., 2 two-st'y brick dwells.; cost, each, $2,500; owner, Moses Sahlein, et al, 88 West Broadway; architect, E. F. Haight; builders, Haight & Monnin.

Eighty-first St., s s, 185' e Fourth Ave., 2 five st'y Connecticut brownstone tenements; cost, each, $20,000; owner, Mary F. Morris and Mary Cahill, 5 Sutton Pl.; architect, J. H. Friend.

East Eighty-sixth St., Nos. 309 to 323, inclusive, 8 four-st'y brick dwells, stone trimmings; total cost, $73,000; owner, Wm. Rhinelander, trustee, 155 West Fourteenth St.; architect, Geo. M. Huss; builders, Cornelius Callahan and G. C. Moore.

West St., No. 304, five st'y brick store; cost, $7,000; owner, E. Long, by E. Yard, attorney; architect, W. H. Smith; builder, Wm. W. Owens.

Forty-ninth St., s s, 375' w Ninth Ave., 2 five-st'y brick and brownstone tenements; cost, each, $12,000; owner, Eliz. Seitz, 84 East One Hundred and Eighth St.; architect, W. S West; builder, C. Seitz.

Ninety-fifth St., s s, 205' e Third Ave., two-st'y brick stable; cost, $8,000; owner, Terence Farley, 161 East Sixty-first St.; architect, C. J. Farley; builder, day's work.

Westches er Ave., n s, 100' w Brook Ave., three-st'y brick dwell.; cost, $3,400; owner, Samuel G. Douglass, Westchester Ave.; builders, George Mand and Haffen & Mooney.

West St., Nos. 47, 48 *and* 49, eight-st'y brick soap-factory; cost, $45, 00; lessee, B. F. Babbitt, 74 to 86 Washington St.; architect, Wm. Graul.

Madison Ave., No. 781, five-st'y granite and brick flat; cost, $18, 00; owners and architects, D. & J. Jardine, 1262 Broadway; builder, Alex. Brown, Jr.

Eleventh Ave., s w cor. Thirty-fourth St., two-st'y brick store; cost, about $14,000; owner, N. Y. C. & H. R. R. R., Grand Central Depot; builders, Bleecker & Heddon; superintendent, J. Richardson.

East One Hundred and Twenty-first St., No. 104; four-st'y brick tenement; cost, $15,000; owner and builder, Thomas Fealey, 2059 Third Ave.; architect, B. Walther.

West One Hundred and Twenty-eighth St., Nos. 24 and 26, 2 seven-st'y brick flats: cost, each, $75,000; owner, Annie Fettretch, 950 Park Ave.; architects, Cleverdon & Putzel.

Alterations. — *East Thirty-fifth St., No.* 157, two-st'y brick extensions; cost, $3,500; owner, Morris K. Jessup, 137 Madison Ave.; builders, McKenzie & McPherson.

Second Ave., No. 110, one-st'y extension; cost, $3,000; owners, Women's Prison Assoc. and Home, on premises: builder, J. J. Tucker.

Sullivan St., No. 24, three-st'y brick extension: cost, $7,000; owner, Samuel Cohen, Long Branch, N. J.; architects, Berger & Baylies; builders, J. Hankinson & Alex. Leslie.

Madison Ave., n e cor. One Hundred and Twenty-sixth St., rear raised 6', new windows, etc.: cost, $5,000; owner, De Witt C. Weeks, Chairman Board of Trustees, Mott Ave. and One Hundred and Sixty-fourth St.; architect, A. Crooks; builder, not selected.

First Ave., No. 105, two-st'y extension, also interior alterations; cost, $3,500; owner, Ernest Ohl, 56 Second Ave.; architect, F. W. Klemt.

Liberty St., No. 1 8, *and No.* 111 *Cedar St.*, repair damage by fire; cost, $4,000; owner, Edward A. Pearson, Superintendent, etc., 120 Broadway, Superintendent Maclay & Davies; builder, S. J. Acken.

Centre St., Nos. 63 *and* 65, rebuild walls, front altered, etc.; cost, $5,000; lessees, Colwell Lead Co.; builder, E. Smith.

East Seventy-fifth St., Nos. 116 *and* 118, raised one st'y, front altered, etc.: cost, $8,000; owner, John Nesbit, 213 Lexington Ave.; architect, J. E. Ware; builder, F. Nesbit.

Philadelphia.

Factory. — On the n s of Naudain St., between Twentieth and Twenty-first Sts., Richard Kershaw will build a five-st'y factory, 60' x 136'; J. F. Stuckert, architect.

Stores. — Elliston P. Morris is about to build, at Nos. 715 and 719 Arch St., a five st'y building, 65' 6" x 130'. The first-st'y front will be of iron; second, third and fourth stories will be of pressed and ornamental brick, with Hummelstown brownstone and terra-cotta finish; Yarnall & Cooper, contractors; J. K. Yarnall, architect.

Office-Building. — The old "Record" building at the s w cor. of Third and Chestnut Sts. is to be remodelled and an office-building made of same, from plans by Willis G. Hale, architect.

Alteration. — Alteration and addition to dwell., at 2211 Green St., and new stable on Twenty-third St., below Green St., for G. Burnham, Esq.; Wilson Bros. & Co., architects.

Alteration and addition to dwell., No. 3807 Chestnut St., for Frank McLaughlin, Esq.; Wilson Bros. & Co., architects.

House. — Mr. T. F. Mende is erecting a four-st'y dwell., 23' x 107', front to be of brownstone; cost, $25,000; J. K. Yarnall, architect.

Building Permits. — *Broad St.*, w s, s of Tioga St., three-st'y dwell., 14' x 28'; Thos. A. Barlow, owner.

Penn St., s w cor. Arrat St., three-st'y dwell., 20' x 59'; W. R. Brown, contractor.

Belgrade St., No. 445, three-st'y dwell., 18' x 49'; David Emerick, contractor.

Hancock St., w s, n of Diamond St., three-st'y dwell., 20' x 64'; Jas. A. O'Donnell, contractor.

Spring Garden St., s s, e of Thirty-second St., 15 two-st'y dwells., 14' x 35'; Elkins & Peters, owners.

Meehan Ave., n s, between Main and Musgrove Sts., 2 three-st'y dwells., 15' x 32'; Wm. Irwin, contractor.

Filbert St., No. 341, one-st'y foundry, 40' x 50'; Jas. Bing, owner.

Germantown Ave., No. 4936, two-st'y stable, 30' x 100'; Edward Kolb, owner.

Riggs St., s s, between Twenty-seventh and Twenty-eighth Sts., two-st'y stable, 30' x 48'; P. F. Riley, owner.

Bridge St., s s, w of Trenton Railroad, three-st'y dwell., 22' x 60'; Jno. Zoelle, contractor.

Morris St., No. 410, three-st'y dwell., 16' x 30'; Chas. Zihn, owner.

Sixth St., n w cor. Diamond St., 2 three-st'y dwells., 18' x 60'; Shezog & Quigley, contractors.

Arch St., No. 1114, brick building and front alterations, 20' x 77'; Andrew White, contractor.

Eighth St., n w cor. Arch St, four-st'y store, 60' x 100'; L. Koder, contractor.

Forty-second St., n w cor. Oregon St., 2 two-st'y dwells., 14' x 28'; Jno. Goldbeck.

Duy's Lane, between Chew St. and Rubicam Ave., three-st'y dwell., 40' x 90'; Jno. Armstrong, contractor.

Richmond St., cor. Allegheny Ave., second, third and fourth st'y addition to factory, 36' x 130'; Boeder, Adamson & Co., owners.

Bodine St., No. 1113, 2 two-st'y dwells., 15' x 30'; G. Specht, contractor.

Walter St., s s, w of Seventeenth St., one-st'y school-house, 18' x 32'; A. W. Haines, contractor.

Clearfield St., n s, e of Kensington Ave., three-st'y dry-house, 16' x 32'; W. Dickson & Bro., contractors.

Oxford St., s w cor. Randolph St., two-st'y factory, 23' x 34'; G. Kindsvater, owner.

Twenty-third St., e s, s of Thompson St., 6 two-st'y dwells., 14' x 41'; Jas. H. Lyons, contractor.

North College Ave., n s, e of Twenty-third St., 9 two st'y dwells., 17' x 44'; Dan Devlin, contractor.

Cumberland St., s e cor. Almond St., 5 three-st'y dwells., 72' x 159'; C. J. Heppe, owner.

St. Louis.

Building Permits. — Fifty-eight permits have been issued since our last report, fourteen of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

D. R. Garrison, 6 two-st'y dwells.: cost, $22,000; T. J. Furlong, architect; J. D. Fitzgibbons, contractor.

M. Shields, 3 two-st'y dwells.; cost, $8,000; G. Huson, contractor.

C. McGuerney, two-st'y dwell.; cost, $2,500.

Thos. F. Colser, 3 two-st'y dwells.; cost, $7,800; Mills, architect; Alex. McAllister, contractor.

Missouri Fire-brick and Clay Co., two-st'y manufactory; cost, $3,000.

Jno. O. Boyle, two-st'y dwell.; cost, $3,000; Meaghen, architect; contract sub-let.

H. Danner, two-st'y dwell.; cost, $3,000; Wm. Springmeyer, contractor.

John McMahon, two-st'y dwell.; cost, $2,650; H. Redmond, contractor.

J. M. Hutton & Co., four-st'y store and office; cost, $12,300; W. G. Hegel, contractor.

Jno. H. Pohlmann, two st'y dwell.; cost, $4,800; H. C. Brinkman, contractor.

J. Winklemeyer Brewing Association, brewery; cost, $25,000; E. Jungenfeld, architect; contract sub-let.

O'Fallon Estate, two-st'y store and tenement; cost, $15,300; B. P. McClure, contractor.

Washington.

Building Permits. — The following are the permits issued since last report: —

John P. Andeesar, three-st'y and basement brick dwell., 23' 3" x 36', cor. Seventh and K Sts., n w; cost, $3,500.

Fourth Baptist Church, R St., between Twelfth and Thirteenth Sts., n w, two-st'y building, 65' x 110'; cost, $25,000.

Oliver Cox, 4 two-st'y brick dwells., 15' x 58', Third St., between I and K Sts., n w; cost, $6,500.

Columbia College, three-st'y and basement school-building, 50' x 53', H St., between Thirteenth and Fourteenth Sts., n w; cost, $15,600.

PROPOSALS.

County Infirmary. [At Evansville, Ind.]

Sealed proposals will be received at the office of the Auditor of Vanderburgh County, Evansville, Ind., up to 1 P. M., **August 12, 1882**, for furnishing all materials and work required to erect and finish complete a county infirmary-building, to be built on the farm recently purchased by the county, in accordance with the plans and specifications on file in the Auditor's office of said county.

Bidders will be required to give satisfactory security, as the law requires, for the faithful performance of contract.

Proposals shall be made upon blanks furnished by the Auditor, and indorsed "Proposal for County Infirmary."

County Commissioners reserve the right to reject any and all bids. WM. WARREN, A. V. C.

PROPOSALS.

Timber, etc. [At Washington, D. C.]

Navy Department,
Bureau of Construction and Repair,
Washington, D. C., July 12, 1882.

Sealed proposals to furnish timber and other materials for the Navy for the fiscal year ending June 30, 1883, will be received at this Bureau until 12 o'clock, M., **the 8th of August next**, at which time the bids will be open.

The proposals must be addressed to the "Chief of the Bureau of Construction and Repair, Navy Department, Washington," and must be indorsed "Proposals for timber, etc., for the Navy," that they may be distinguished from ordinary business letters.

Printed schedules of the various yards, with instructions to bidders, forms of offers and other information can be obtained on application to the Purchasing Paymaster or Commandants of the respective navy-yards, or to the Bureau of Construction and Repair, Navy Department.

No contracts will be awarded until after appropriations to cover the same have been made by Congress and been duly approved.

T. D. WILSON, Chief Constructor U. S. Navy,
Chief of Bureau of Construction and Repair.

Board of Trade Building. [At Chicago, Ill.

Sealed proposals will be received by the Board of Real Estate Managers of Board of Trade of the City of Chicago at their office 241 La Salle St., **up to noon of August 1, 1882**, for all of the cut-stone or granite laid in the wall required in the construction of their building. The building will be 174' x 226', with a height of about 140'. The stone-work of the first story to be completed the present building season, and the entire stone-work to be finished by October 1, 1883. Proposals may be made for granite (one or two shades) or for sandstone or limestone. Tracings, details and specifications may be seen at the office of Nathaniel T. Bradlee, Pemberton Square, Boston, Mass. The managers reserve the right and privilege of rejecting any or all proposals made as well as to adopt any kind of material proposed or to accept any proposal made irrespective of its relative cost as compared with other proposals submitted. Specimens of material to be submitted with the bids.

Hospital. [At Harrisburg, Pa.]

Harrisburg, Pa., July 13, 1882.

Sealed proposals for the furnishing of the materials and the erection of a new brick building on Front St., Harrisburg, Pa., for the Harrisburg Hospital, will be received **until 2 o'clock, P. M., Fri ay, the 4th day of August, 1882**. Plans and specifications for the same can be seen at the office of Luther M. Simon, architect, opposite the Penn lock, Harrisburg.

The successful bidder will be required to enter into a contract and give a good and sufficient bond for the prompt and faithful performance of the same. The name or names of the parties proposed as securities must be stated in the bid.

The managers reserve the right to reject any or all of the bids, and to accept such bid as they may consider advantageous to the hospital.

Proposals may be addressed to either of the undersigned, endorsed "Proposals for the erection of new Hospital Building."

Bids will be opened at the office of the hospital, No. 127 South Front St., at the hour and date above mentioned, in the presence of the managers and of such bidders who may desire to attend.

HENRY M'CORMICK,
CHARLES L. BAILEY,
RUDOLPH F. KELKER,
344 Building Committee.

Steam-boilers, etc. [At Columbus, O.]

Sealed proposals will be received by the Adjutant-General, Treasurer, and Secretary of State, **until 2 o'clock, P. M., of Wednesday, the 16th day of August, 1882**, at the office of the Secretary of State, in the State-House, Columbus, O., for the construction and erection of certain works, and for making alterations at the said state-house.

The work will be divided as follows, viz.:

CLASS NO. 1.

Supplying and setting four steam-boilers, each 30' long and 4' 6" in diameter, with all necessary mountings.

CLASS NO. 2.

Supplying, fitting and hanging sundry steam-pipes and fittings, and also taking down, refitting and hanging sundry other steam-pipes and fittings.

CLASS NO. 3.

Supplying and fitting gas and water pipes.

CLASS NO. 4.

Masonry, plastering and concrete.

CLASS NO. 5.

Constructing raised floors in the Senate Chamber and House of Representatives, and sundry other carpenter-work.

CLASS NO. 6.

Sheet-metal and iron work.

CLASS NO. 7.

Paving and gas-tar concrete in basement.

The work may be let as a whole or in separate contracts, for each class of work indicated above.

Proposals must be made only on the forms supplied for that purpose.

The right to reject any or all proposals is reserved.

Satisfactory security will be required for the proper performance of the work under each contract.

Plans may be seen, and specifications, forms of proposals and forms of contract obtained, at the said office of the Secretary of State, Columbus, O., or at the office of Messrs. Anderson & Hobby, Civil and Sanitary Engineers, Johnston Buildings, Cincinnati, O.

SAMUEL B. SMITH, Adjutant-General.
JOSEPH TURNEY, Treasurer.
345 CHARLES TOWNSEND, Secretary of State.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co. No. 345.

AUGUST 5, 1882.

Entered at the Post-Office at Boston as second-class matter.

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As we have before had the pleasure of announcing, the Sixteenth Annual Convention of the American Institute of Architects is to be held in Cincinnati on Wednesday and Thursday, October 25 and 26 next. The Committee of Arrangements have made provision for the entertainment of delegates and visitors at the Gibson House, on Walnut Street, at the very favorable rate of two dollars per day, the regular prices being three and one-half and four dollars. Lunch is to be provided each day by the Cincinnati Chapter, and in the intervals of business members of the Chapter will conduct their visitors to visit the various objects of architectural and artistic interest in and about the city. The Committee request offers of papers on professional subjects, and we hope that many will be disposed to second in this way the generous efforts of the Cincinnati architects to provide for the pleasure of their guests. A special invitation is given to members of the profession not yet affiliated with the Institute to meet the Fellows and Associates at the Convention, which will, we are sure, meet with unanimous approval. Since the establishment of the Institute a great change has taken place in the condition of the profession in the United States. Technical instruction, instead of being a thing to be either picked up by experience or acquired in European schools, is now systematically and successfully given in five or six different establishments of learning, and around these have grown up groups of educated and earnest men, which, although absolutely identical in sympathies and interests, remain indifferent to each other; and while the general progress of the profession has been very rapid, it has been, and still is, made in a desultory and incoherent manner, which detracts much from its real value as an advance toward a true and great American art. Another element, still more difficult to assimilate, also begins to be conspicuous among us, in the shape of a body of thoroughly trained foreign architects, whose sympathy and co-operation in our professional work would be of quite as much value to us as to them.

ANYTHING which might tend to bring these various groups into a mutual understanding would be of incalculable benefit to the whole profession, and every opportunity should be sought for promoting it. One such opportunity, and a very good one, will be afforded by the Cincinnati Convention, and we are glad to see that the Committee recognize by their invitation the importance of it. At the same time, the local Chapter is small, and although its zeal and good will is unbounded, we take the liberty of reminding our readers that the success of the meeting rests quite as much with the architects outside of Cincinnati as with their brethren there; and that if they will think a little over the ways in which they can help the work, and follow out the suggestions which will readily occur to them, arranging to attend the meeting if practicable, or if not, to be represented by a paper of interest and value; securing promises from others to attend, or still better, helping to form parties for the occasion; transmitting the invitation of the Committee to those architects who might not otherwise have received it, but whom the Convention would be glad to see, and obtaining their acceptance of it, they will not only gain the gratitude of the hospitable architects of Cincinnati, but will enjoy the satisfaction of having contributed toward the success of the most important professional meeting ever held in the country.

THE first of August was signalized among the wholesale lumber dealers by an advance in the price of white pine of two dollars per thousand feet on shelving stock and superior grades, and of one dollar on inferior grades. This represents an average rise in value of only about four per cent, but the movement acquires additional importance from being in opposition to the general tendency of the market, and is probably the precursor of a large advance when the next building season begins. Meanwhile certain enterprising dealers have taken advantage of the prospect of a scarcity in the supply of pine to introduce cypress lumber from the southern swamps, which is sold at a price rather lower than hard pine, and seems to be well adapted to some purposes. Whether the timber can be readily obtained of sufficient length and straightness to make it generally useful for framing we do not know. Perhaps some of our readers can give us information as to its tensile and transverse strength and other qualities, concerning which we find nothing in the ordinary books of reference.

THE latter days of the Hamilton sale of bric-à-brac were apparently more successful from a financial point of view than the earlier ones. It is customary in such transactions to keep the more valuable objects to the last, and the best of the pictures, as well as the most precious pieces of furniture, porcelain, and glassware, were sold together. So far as we can judge, the prices obtained for the latter justified the policy of the auctioneers in retaining them until they had been well advertised, but something — perhaps the doubt as to their authenticity which is said to have existed — seems to have chilled the enthusiasm of the picture buyers. The greatest treasure in the collection, a picture of the Last Supper, by Masaccio, which if genuine would be perhaps the only easel painting, except a few portraits, known by this great artist, was bought by the National Gallery for six hundred guineas, or a little over three thousand dollars. Two pictures by Correggio brought about fifteen hundred dollars apiece; a portrait by Titian brought three thousand, and a Holy Family, also by Titian, six thousand, the two together selling for less than the amount which the proprietor of a New York bar-room, himself just out of jail, recently invested in the purchase of a single modern French picture to adorn his establishment. A portrait of Mary Queen of Scots, which, coming from the Hamilton Palace, certainly ought to have been authentic, brought eighteen hundred dollars, or probably about one-fourth of what it could be sold for at any time in New York. In contrast with these, a glass pitcher of early Oriental manufacture, gilt and enamelled, sold for nearly fourteen thousand dollars, and a writing-desk, of inlaid work, for thirty-one thousand; a tazza, of Henri-Deux or Oiron ware, four inches high, and with the cover missing, brought six thousand dollars, and a salt-cellar of the same ware four thousand; while another tazza, of Limoges enamel, brought eleven thousand. A chandelier, of rock crystal, sold for twenty-two hundred dollars, and would, at that price, seem cheaper than the four-thousand-dollar salt-cellar, were it not that a similar salt-cellar sold many years ago for just double the price of this.

THE Exhibition of the Salon of 1882 closed after a remarkably successful season. Five hundred and sixty-five thousand persons visited the galleries, of whom more than half were admitted free, but the entrance fees of the remainder produced

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the sum of three hundred and forty-nine thousand francs, or about seventy thousand dollars. Twenty-five thousand francs were paid by the publisher of the catalogue for his monopoly, and twelve thousand by the proprietor of the restaurant attached to the galleries. The total outlay is estimated at one hundred and fifty thousand francs, leaving a net profit of two hundred and six thousand francs, or forty-one thousand dollars. The net proceeds of last year's exhibition amounted to twenty-four thousand dollars, so that an administration of two years under the new régime has accumulated a fund of sixty-five thousand dollars for the purposes of the Society of Artists.

The stockholders of the Keely Motor Company do not, according to the Philadelphia *Times*, get much nearer the revelation of the mighty secret for which they have suffered so much. After the decree of the court, requiring the inventor to disclose his mysterious process to some authorized expert, a meeting of the stockholders was held, and Mr. William Boekel, a mechanic who had made certain portions of the Keely machine, was selected to be the recipient of the secret. He was accordingly admitted to Mr. Keely's workshop, and after two or three months' study informs those stockholders who make inquiries of him that he has learned nothing that he did not know before, but has hopes of better success before long. Meanwhile, loud noises are often heard to proceed from the workshop, which no one is allowed to enter except the inventor and Mr. Boekel, and some of the stockholders are encouraged to think that this denotes renewed activity there. Others, less sanguine, who have listened surreptitiously at the doors, assert that the sounds come from explosions of gunpowder, and that Mr. Keely simply goes to the place in the morning, fires off a little powder in the "hydro-compressor," and then locks the doors and betakes himself to the Park, where he spends the rest of the day in exercising a fine trotting horse, bought, they fear, with their money. Naturally, such thoughts as these fill them with indignation, and they threaten, unless the mystery is disclosed before the end of this week, to commence a criminal prosecution against the inventor for deceiving them.

Some interesting experiments have been recently made by Professor Renk, in Munich, to determine the conditions affecting the movement of the ground-air under and about dwelling-houses. By tests with the barometer he found that the atmospheric pressure in the ground beneath the bottom of the cellar of the house in which his experiments were carried on was always greater than in the cellar itself, the natural consequence of this difference being a steady movement of the air from the soil into the house, which would be little, if at all, hindered by walls or pavements of masonry. Another experiment showed, however, that the movement was slow, and indicated a mode in which it might perhaps be counteracted in case of need. Beneath the pavement of the cellar in question was a ventilating channel, through which air was drawn from some place at a distance to a large chimney. Although this channel was built of bricks laid in mortar, and covered with stone slabs, its draught was very sensibly felt in the soil six yards away, and within that distance the tendency of the ground-air was toward it, instead of toward the cellar, while a considerable movement of air toward it from the cellar itself was detected. These observations lead Professor Renk to think that an arrangement of permeable tubes buried in the earth under the cellar of a house, and connected with the kitchen flue, might serve to intercept the ground-air on its way into the house, and carry it harmlessly away above the roof. Although we think that a good lining of asphalt would be more effective in preserving the purity of the atmosphere of a cellar than such ventilation, the suggestion is well worth remembering.

A rather novel dispute has arisen between the managers of the Berlin Sanitary Exhibition and the parties who had contracted for advertisements in the official catalogue of the exhibition. It seems that at the time of the conflagration which destroyed the exhibition buildings, with a large part of the goods in them, the catalogue, including the advertisements, was printed and nearly ready for distribution. Whether all the copies were burned with the rest of the properties of the affair we do not know, but they could hardly have been more useless if they had been. However, the managers of the exhibition have sent out bills for advertising according to their contracts, just as if the affair had been carried through with complete success, and one or two hundred thousand persons had perused the inviting announcements designed for them. It is only charitable to consider that the managers are straining every nerve to revive their enterprise after the overwhelming blow which it suffered from the fire, and probably feel bound to take the benefit of any doubt in claiming money which might by any possibility be due them, but it is not surprising that the advertisers resist the claim. Some concession is offered them, in the shape of a promise that those who pay shall have the privilege of advertising at half rates in the new catalogue, when the exhibition really comes to be held, but this does not seem to afford them much consolation, and an instructive case of interpretation of contracts is likely to come before the courts in order to decide the question.

Some extraordinary experiments have been made during the past year by Mr. Crookes, the celebrated investigator of the properties of matter under the simplest possible conditions. Probably every one has seen whirling in the sunshine in druggists' windows a little wheel enclosed in an exhausted glass bulb. This is the radiometer, the wonderful apparatus whose movement is due to the physical effect of the cannonade of molecules driven against the vanes of the wheel by the power of the sun's rays, and following out the same idea many new and interesting phenomena have been observed. The more recent investigations have been made with vacuum tubes traversed by an electric discharge, like the well-known Geissler's tubes, whose colored flashes serve to give *éclat* to so many amateur lectures on physics. Professor Crookes's vacuum tubes are, however, much more perfect than those ordinarily sold, being exhausted with the Sprengel pump until the tension within them is only one millionth of an atmosphere; or in other words, the number of molecules contained in it is a million times less than would be contained in an equal bulk of air at the ordinary pressure. Under such exhaustion the passage of an electric discharge through the tube reveals a singular phenomenon. Instead of filling the tube with a lambent flame, such as is seen in the ordinary Geissler's tubes when the current is sent through them, the discharge in a medium so highly rarefied does not become visible for some distance from the negative electrode, the intermediate space being completely dark, and the length of the dark interval increasing with the degree of exhaustion.

This appearance, hitherto not satisfactorily explained, seems to Mr. Crookes to indicate that in such a tube the molecules exist under a condition which may be likened to that of a moderately frequented street, as compared with the same street occupied by a dense and strongly agitated crowd, which represents the usual state of the molecules in the atmosphere. The disturbing influence of excessive number being removed, such molecules as exist in the tube are repelled by the negative electrode with a violence which throws them for some distance in parallel lines, and it is only after the impulse has been in some degree counteracted by the opposing force of return currents that collisions occur among the molecules, which exhibit themselves by the production of light. That a strong and steady movement of molecules exists through the dark space, away from the negative electrode, is shown by means of a little wheel, which on being introduced into the space is made to revolve with great rapidity by the impact of the molecules against it. By interposing a piece of glass in the current, moreover, a bright phosphorescent spot is formed at the point where the invisible stream strikes it, and an obstacle put between the electrode and this glass will throw a shadow in the middle of the phosphorescent spot. A more remarkable observation, however, is that the path of the molecules is very much deflected by a magnet, tending to assume a spiral form, and even the earth's magnetism affects it sensibly. The impact of the molecules against other bodies produces heat as well as light, as was shown by using a cup-shaped electrode, from which the atoms, being driven directly away from the surface, would converge to a focus. In the focus so obtained platinum was melted, without heat, simply by the violence of the blows inflicted by a stream of invisible molecules, disembarrassed of the crowd of opposing atoms which under ordinary circumstances continually hamper and neutralize each other's movements.

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BUILDING SUPERINTENDENCE.—XX.

HARDWARE.

Sliding-door Furniture. THE sliding-doors between Parlor and Hall are to be hung in the best manner with Prescott's patent balance hangers complete; to have Russell & Erwin's solid bronze sunk handles, pattern No. 332, dark finish, and bronze astragal-face sliding-door locks and pulls of the same make pattern No. 333.

Butts. The front outside double doors are to be hung with 6″ x 6″ Russell & Erwin's fancy solid bronze dark finish acorn loose-pin butts of pattern No. 15, three to each leaf, with steel bushings and steel washers.

All other doors in first-story Hall, Vestibule, Parlor and Dining-room are to be hung with 5″ x 5″ bronze acorn steel-washer japanned loose-joint butts, three to each door or leaf of double doors.

All other doors throughout the building are to be hung with 4″ x 4″ japanned loose-joint acorn butts with steel washers, two butts to each door.

Locks. The front door is to have Enoch Robinson's patent front-door mortise lever-lock, with brass or bronze face and striking-plate and night-latch, with one key to the large lock and four to the night-latch.

All other doors throughout the building to have Russell & Erwin's, Corbin's, or Nashua Lock Co.'s 5-inch mortise-locks, with brass face and striking-plate, brass bolts, and German-silver or plated keys; no two keys in the house to be alike. The outside kitchen door is to have in addition a Yale rim night-latch, with two keys.

Knobs. The front outside door is to have Russell & Erwin's fancy solid bronze dark finish 2½″ knobs, pattern No. 923, on both sides of one leaf only. Doors in basement, kitchen and attic to have 2¼″ best lava knobs with bronze roses and escutcheons. All other doors throughout the building to have Russell & Erwin's 2¼″ fancy solid bronze dark-finish knobs, pattern No. 933. Double doors to have knobs on one leaf only.

Bell-Pulls. The carpenter is to furnish bell-pulls to front and kitchen outside doors, to correspond with the door-knobs.

Bolts. The outside front and vestibule doors, and double doors between first-story Hall and Dining-room are to have bronze-metal flush-bolt at top and bottom of the leaf which has no lock, and front outside and vestibule doors will have in addition a strong solid bronze chain bolt. The kitchen outside door, door at head of basement stairs, door of basement water-closet, and doors of bath-room and all chambers in second story, to have Ives's patent mortise-bolts with bronze roses and bronze keys.

Cupboard Doors. All cupboard doors to be hung with brass butts and to have brass slip-latches.

Drawer-Pulls. Drawers of wash-bowl stands to have handsome brass drop-handles. All other drawers to have plain japanned iron pulls.

Sash-Fasts. All double-hung windows to have Morris's patent self-locking sash-fasts, to be of solid bronze in first-story Hall, Vestibule, Parlor, and Dining-room; bronzed iron with plated drops elsewhere, and two pulls on lower sash to correspond.

Hooks. Put heavy triple hooks of japanned cast-iron in closets and other places specified: to be in two rows unless otherwise expressly directed, and to be 8″ apart in each row; those in the upper row to be set over the middle of the spaces between those in the lower row.

Screws. All brass hardware to be put on with brass screws, plated with plated screws, bronze or bronzed with bronze screws, and japanned with blued screws.

STAIRS.

[*This is very commonly made a separate contract, and in that case the General Conditions should precede.*]

Front Stairs. The front stairs from first to second story are to have open string, moulded nosings returned at the ends and carried around well-room, ⅞-inch risers and treads, housed into the wainscot on the wall side, the treads ploughed into the risers, and risers ploughed into underside of treads; 1¾-inch fancy turned balusters, two to a tread and around well-rooms in the same proportion, all dovetailed at the foot and tenoned into underside of rail; 2¾″ x 3½″ double moulded hand-rail; 4″ x 4″ solid turned, chamfered and fluted posts at angles, with half-post at upper termination of rail, and 5″ x 5″ fluted and carved boxed posts at foot: all to be strictly in accordance with detail drawings. The posts and rail are to be of best Spanish mahogany, all the rest to be of cherry. Outside string on stairs, and face-board around well-room, to have moulding to cover joint with plaster.

Back Stairs. The back stairs from first story to attic are to have open string, rounded nosings returned at the ends and carried around well-rooms; ⅞-inch risers and treads, the treads ploughed into risers, and risers ploughed into underside of treads, and both treads and risers to be ploughed for the base on the wall side; 1¼-inch plain round balusters, two to a tread and around well-rooms in the same proportion, and mortised at top and bottom; 2″ x 2¾″ plain moulded hand-rail, and 3¾″ x 3¾″ solid turned and chamfered post at each angle and at foot, with half post at upper end of rail: all to be according to detail drawings, of hard pine throughout.

Cellar Stairs. The stairs to cellar are to go down under the front stairs; to have ⅞-inch risers and treads with rounded nosings, ploughed for base; 1¼-inch plain round balusters, two to a tread, and mortised into treads and under side of rail, and 2″ x 2¾″ plain round hand-rail: all to be of hard pine.

All stairs are to be framed and supported in the best and strongest manner, on 2″ x 12″ spruce strings 12″ on centres: all to be thoroughly wedged, blocked and glued in the best manner, and left clean and perfect. The stair-builder is to put on all the face-boards and nosings around well-rooms, and is to furnish and put on plain square hard-pine base on wall side of back stairs and cellar stairs, ploughed into treads and risers, and is to do all the work of housing the front stairs into the wainscot.

BELLS.

[*This is often included in the carpenter's contract. If it is separated the General Conditions should precede the Specification. If electric gas-lighting is introduced (see specification below) the bells may be included in the contract with it.*]

Put in electric bells as follows, with annunciator in kitchen, battery, insulated copper wires, push-buttons to match finish of rooms, and bells of five different tones, all put up in the best manner and warranted for three years:

Bell from front door to ring in Kitchen and in Attic hall.
Bell from Kitchen outside door to ring in Kitchen.
Foot-bell from Dining-room to ring in Kitchen.
Bell from Parlor to ring in Kitchen.
Bell from second-story Hall to ring in Kitchen.
Bell from second-story Hall to ring in Attic Hall.

The pulls for the outside front and Kitchen doors only will be furnished by the carpenter.

All wires to be run behind the plastering.

ELECTRIC GAS-LIGHTING.

[*The General Conditions should precede the Specification unless this is joined with some other contract.*]

Wire all the gas outlets in the building with the best insulated copper wire, all concealed behind the plastering. The drop-light in first-story Hall is to be wired for automatic burner, to light from wall of Hall near door to Vestibule, and also from east wall of chamber over Dining-room, just under the bracket outlet. The bracket at foot of cellar stairs is to be wired for automatic burner, to light from wall at head of stairs. All other outlets are to be wired for pull-burners.

When directed, after the fixtures are in place, put automatic burners on first-story Hall lantern and on bracket at foot of cellar stairs, with buttons as above specified; and put four pull-burners on Dining-room chandelier, six on Parlor chandelier, four on brackets in Parlor, three in each of three principal chambers in second story, of which two will be on the mirror light, and one on bracket as directed; one on second-story Hall bracket, and one on bracket in Bath-room. All to be of the best pattern, perfectly tight against any escape of gas; all fitted up in the best manner, with battery complete, and to be kept in good order free of expense for two years.

PAINTING AND GLAZING.

[*If this is made a separate contract the General Conditions should precede the Specification.*]

Outside. Oil hard-pine piazza and porch floors and treads of steps two coats.

Stain. Stain sheathing under piazza and porch roofs with one coat of light oil of creosote.

Paint. Paint all roofs one coat of pure Venetian red in oil, finishing with a second coat of pure Indian red.

Paint all other outside wood and metal work two coats, of three tints as directed: the first story to be one shade, the second story another, and the doors and trimmings a third. Paint also the mouldings on belts, etc., where directed, in Venetian red.

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Paint the blinds three coats of color as directed.
Paint sashes three coats of color as directed.

Inside. Floors. All hard-wood floors and borders, including hard-pine floors in Kitchen and Basement, are to have one light coat of oil, and to be finished with hard wax or Butcher's Boston Polish, put on in the best manner and well rubbed. Other hard-pine wood-work, and all ash and whitewood finish, to be filled with oil filler, and to have two coats of Pellucidite, rubbed down with emery cloth and oil. The maple finish in Parlor is to be filled with oil filler and to have three coats of white shellac, rubbed down with emery cloth and oil. The cherry stairs are to be stained in the best manner to imitate mahogany, filled with oil filler and finished with two coats of Pellucidite, rubbed down with emery cloth and oil. The mahogany posts and rails are to be filled and varnished with two coats of best copal varnish. Oak wood-work in Hall is to be oiled one light coat, and finished with Butcher's Boston Polish, or hard wax, well rubbed. The pine in Attic hall and large room is to be oiled one coat and varnished with two coats of copal varnish. Other wood-work in attic is to be painted three coats of pure zinc white and oil, to finish with a plain oil surface, not flatted.

Sashes. Inside of sashes to be stained cherry color and varnished.

Pipes. Varnish all exposed lead and brass pipes and bands with one coat of white shellac.

All materials are to be of the very best quality. Pure linseed oil only is to be used. The body for inside work is to be pure zinc white, and for outside work to be the best French ochre. No lead to be used for outside work unless expressly directed, and in that case to be pure Jewett's, Union or Salem white lead.

Puttying. Wax. Putty-stop thoroughly and smoothly all work inside and outside after the first coat and before the last coat, coloring the putty to match the wood after darkening. Use wax suitably colored instead of ordinary putty, wherever wax finish or Butcher's polish is specified.

Knots. Cover all knots, sap and pitchy places with strong shellac, and kill knots or pitch with lime where necessary. Sand-paper all inside work, rubbing with the grain, and clear out all mouldings before the first coat, and sand-paper after each coat of paint, shellac, Pellucidite or varnish except the last.

GLAZING.

[*This is almost invariably included in the contract for painting.*]

Glaze all inside and outside sashes, except those specified to be furnished ready glazed by the carpenter, in lights as shown on drawings or as directed, with first-quality double-thick French or German glass; all well bedded, puttied, back-puttied, and tacked, and all repaired at the completion of the building, thoroughly cleaned and left whole and perfect.

BUILDERS' SCAFFOLDING. — IV.

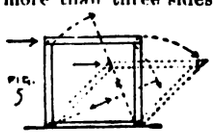
THE action of bracing in resisting the overturning of a structure is simply dependent on the principle of gravity that it would involve an effort in the lifting of the weight of the structure, up to a height equal to the excess in length of the diagonal between points of bracing over that of the vertical height of head of brace above its foot, after the manner of a crank or lever turning on the foot of the brace, provided that the brace, its connections, and fixtures held good. (See Fig. 1.)

The action of a tie, on the other hand, must depend for the rigidity and stability it produces upon the eccentricity of the arcs and their increasing divergence, which the effort of countervailing forces would tend to describe by the upper end of tie, and by the vertical turning on its lower point, provided of course that its parts, connections, and fixtures held good, and only its elasticity yielded. (See Fig. 2.)

The triangle is the only geometrical figure which cannot possibly distort its form without breaking its joints and lengthening and compressing its alternate sides, and hence, as it involves no transverse stress in its pieces, except the pins or bolts, etc., which unite its parts together, is absolutely unchangeable so far as any elastic tension or compression is due to the materials as usually adopted in the ordinary range of structures, and not being liable to the derangement attendant upon figures of more than three sides (see Fig. 5) is therefore the only eligible elementary form adapted to *bracing* and *trussing;* the only conditions to be observed in regard to it to insure rigidity being that the vertical and horizontal sides in bracing shall be nearly of equal length so that the included angles shall be nearly equal. All the joints and parts must be perfectly rigid to avoid the *first* movement which the active forces tend to produce, which will derange a frame combination, since when once a movement *begins* it creates increasing force in the direction of distortion and danger, until its potency becomes irresistible by the lessened remaining strength and stability residing in the structure. (See Fig. 4.)

Fig. 4

Fig. 5



The thorough comprehension and observance of the practical application of these principles in mechanical construction would obviate the many useless and delusive methods of bracing we frequently see. I have seen bracing like Figure 6, on 2″ x 4″ standards to scaffolding 30 feet high, which produces a transverse strain on the standards, if there is any yielding of the joints and swaying of the structure, which is liable. In this case there ought to be horizontal ties, as shown by dotted lines, added to complete the elementary triangular figures in order to make the bracing effective, and as the foot of the brace acts with a thrust against the middle or weakest point in the standard, a lower tie-brace should be added; these, however, in this case (for plastering or such light work) need not be repeated at each standard — one at each extreme standard, if not over forty to fifty feet apart, will usually suffice, provided that the joints or connections, etc., are adequate.

When the braces or ties are very long, and intersect or interbrace with the view of supporting each other (see Fig. 7), there is a

Fig. 6

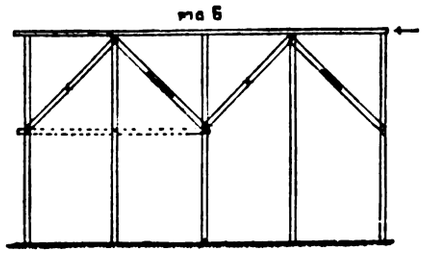
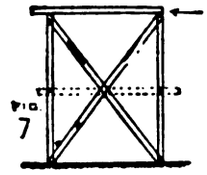


Fig. 7



transverse as well as compressive and tensile strain produced by fastening the bracing together at intersecting points, if some of the joints yield more than others, or if there is a difference of elastic action on either side of the intersecting joint owing to knots or intermediate joints in any diagonal piece, which would of course have to be provided against in estimating the scantlings to be used. It would be economy and serve a better purpose in such cases to introduce a horizontal tie, as shown by dotted lines, which will divide each of the large triangles into smaller ones having sides only half as long.

Timber is permanently injured if the elastic limit of its strength or resistance is exceeded, *i. e.*, if its elasticity (or the power to regain its normal straightness when the transverse load or stress is removed) is destroyed, and it gets a *permanent* "set," when it may be regarded as having begun to break by its *over*load, that is, some of the innumerable little fibres are ruptured, and hence incapable of further resistance to strain. To be within the safe elastic limit [1] of strength a permanent quiescent load should not exceed one-fifth of the breaking load, or one-tenth of it for a moving load. The factors of so-called safety which were adopted in the foregoing calculations [2] are graded according to the order in which the forces are primarily received and transmitted: First, the primary stresses of the vertical loads, which are given the higher factors; and second, the transmitted strains on the oblique members produced by movements of the load receive the lower factors. The factors are properly low because materials will sustain a higher strain for a short time without apparent injury than if applied permanently, which would produce increasing weakness with the lapse of time. In any case due allowance must be made for wear and tear, for weakening defects, as knots, shakes, auger-holes, wanes, etc., which are too often disregarded.

The so-called "factor of safety" is a grievous misnomer. "Factor of Doubt" would be a proper term, of more correct significance, and less liable to mislead the unwary.

As the strains on any structure should never exceed the *elastic limit* of resistance of its materials, and in important permanent designs and construction the strains should always be considerably within the elastic limit, and as we certainly never wish to approach the breaking strains, the co-efficients of *elastic* limit are the nearest to those which are most generally in demand in practical designing of scantlings, etc., for temporary construction. It would, therefore, facilitate calculations and in some measure avoid the danger of mistakes in making arithmetical subdivisions of breaking strains, which are never used without division, if co-efficients of elastic limit, which are ready at hand for immediate use, were adapted for practical use in tables of strength of materials. There does not appear any good reason for incumbering practical men with tables of breaking load when only an aliquot part of it can be used in any formula, in designing, whereas the co-efficient of elastic limit may be used in the

[1] Some writers, even dignified professors, have been making use of several elastic limits, more especially for iron and steel. There ought to be only one elastic *limit*. Any other condition should be considered as simply a degree of elastic reaction, and not the *limit*. Such terms as "scientific elastic limit," "commercial elastic limit," etc., should not be introduced because liable to lead to doubt as to which is meant if any neglect to specify which is intended, and is also very liable to interested abuse and as a shield for dangerous designing. With regard to wood some experimenters have concluded there is no elastic limit, as every elongation produces a permanent set, from which by removal of strain it does not entirely recover. The elastic limit is usually deduced from the extension of small samples of the materials.

[2] See paper No. III in May number.

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majority of temporary cases without any sub-division. In the permanent instances where a greater reserve of strength, as ¼ of the breaking strength is desired, ¼ of the *elastic* limit would be its equivalent, and so for any other greater or less proportion of breaking strength can be used the equivalent of the *elastic* limit. If we wish to use a lower factor of safety, as 4 (= ¼ of breaking strain) = ¾ or .75, therefore the elastic limit × .75 is the equivalent proportion; or if ½ of breaking strain, then take ½ = .50 of the elastic limit. The process may be formulated thus: —

$$\frac{\text{Ratio of Elastic Limit to Breaking Strain — say 3}}{\text{Given Factor of Safety — say 6}} = \text{Equivalent Divisor for Elastic Limit} = \tfrac{2}{3} \text{ or } \tfrac{1}{2}.$$

This desirable change would be in harmony with our proverbial progressive ideas in other matters, and when considering the matter from the point of view of those to whom the computation of strains and forces in structures is a great perplexing effort, there should be an endeavor to clear *their* path of as many useless obstacles — unimportant though they may appear to the expert engineer — by lessening the number of arithmetical operations.

We have here assumed, for the sake of simple, illustrative purposes, that the average elastic limit of timber is ¼ of its breaking strength, as is usually done. The actual elastic limit of practical tests necessarily varies with the kind, quality, state of growth, seasoning, and other individual conditions of the timber under consideration.

Authors and experimenters have differed greatly in their results, and hence the absolute necessity of one invariable method of testing and valuation (and preferably on one machine) being generally adopted in the future in order to obtain uniform data.

There is also the further practical consideration that the elastic limit of writers is that of perfect specimens of materials obtained from experiments with small unit test-pieces, and that average good merchantable timber, especially what may be called the degraded grades of western yards, used in buildings will seldom give more than ⅔ or ¾ of these unit strengths.[1] We should therefore be governed by this fact in adopting a sufficiently small part even of the elastic limit. Most of the sudden and otherwise unexplained collapses of floor-joists, called accidents, must be attributed to the presence of weakening (and often disregarded) knots, etc., or an overloading of the elastic limit.

We cannot shut our eyes to the fact that to most untrained minds the adopting a small proportion of a breaking strain looks to them like unnecessary precaution, and hence we find great reluctance on their part to adopt small proportions which shall insure reasonable safety, or rather satisfy reasonable *doubt*, and hence we should not lose sight of the existing danger of inexperienced men misusing these tables — by not knowing their true practical value in any given conditions of materials, or their purpose — and consequently adopt too high constants, and hence by adopting the elastic limit in lieu of breaking strength, an equivalent diminution of constants does not look so formidable a precaution.

EXPLANATORY NOTES.

Fig. 4. The straight arrow shows direction of force applied to change form of triangle; the dotted eccentric arcs and arrows show the tendency to break upper joint before distortion could take place. The two lower joints or angles are intended to be represented as fixed and immovably anchored.

Fig. 5. Shows by arrows a force applied to change form, in dotted lines, of a four-sided figure, not braced or counterbraced; the dotted diagonals indicate the consequent shortening of the one and lengthening of the other, within the distorted frame.

Fig. 6. Arrows indicate a side force on the scaffolding, and the tendency of the braces to produce transverse strain in the standards; × indicates compressive strain, and the double-headed arrows indicate tensile strain.

Fig. 7. Same explanation as Figure 6.

THE ILLUSTRATIONS.

PRESBYTERIAN CHURCH, SOUTH ORANGE, N. J., MESSRS. ROSSITER & WRIGHT, ARCHITECTS, NEW YORK, N. Y.

The perspective hardly does justice to the building. The situation is unusually fine, and it shows to fine advantage from the point of view chosen for the sketch.

We think it will be of interest to your readers to learn the exact cost of the building. We quote from our books the following statement:

Mason's Contract		$8,000
(Contract.)	Extra work from changes	1,500
"	Corner-stone	13
"	Drain.	150
"	Carpenter's Contract	5,825
"	Extra work from changes	44
"	Pews and Fittings, Pulpit, etc.	3,110
"	Gas Piping	88
"	Slate Roof, etc.	717
Allowance for Old Foundation		200
Furnace		300
	Total, complete	$19,947

We were absolutely prohibited to spend a cent over $20,000. The problem was to get the best possible for just $20,000 and no more.

[1] We do not here allude to special dimension stuff used for bridge-building and other important engineering structures.

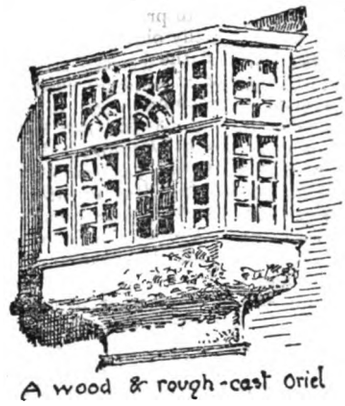
ASSOCIATES' HALL, MILTON, MASS., MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON, MASS.

DESIGN FOR A HOUSE AT DES MOINES, IOWA, MR. G. W. BIRD, ARCHITECT.

COTTAGE FOR GEORGE L. BRADLEY, ESQ., POMFRET, CONN., MR. HOWARD HOPPIN, ARCHITECT, PROVIDENCE, R. I.

LEGAL NOTES AND CASES.

Contract. — Work done without Authority.



IN the case of *Mulligan vs. Kenney*, heard and determined by the Supreme Court of Louisana, in January, the plaintiff was employed by the defendant to put a bell in a church tower. The plaintiff found, while performing his work, that some of the beams of the tower were rotten and urged the defendant to allow him to make the necessary repairs. He informed Mulligan that he had no authority to make any contract exceeding fifty dollars in amount, without the sanction of higher church officials, and only consented to allow the work to be done upon Mulligan's guaranty that it should not cost more than forty-eight dollars. Mulligan was further advised of defendant's unwillingness, owing to financial difficulties, to incur heavier expenses for repairs, however necessary, defendant saying to him that he would see the tower tumble down before he would do so. While Mulligan was employed in the work contracted for, defendant left the city for Europe, and was absent about two months. Thereafter, Mulligan discovering that the cross-timbers supporting the roof of the church were rotten, exposing the roof to danger of falling, without consulting any person, and without communicating at all with the absent owner, braced and strengthened the timbers with iron ties, plates and bolts, and other reparations, and upon the return of the defendant from Europe presented him with a bill for more than $1,600, on which the present suit is brought. The evidence is that the repairs were insufficient to render the supports of the roof safe, and left them still in need of new and expensive work to accomplish that purpose, in the execution of which the work and materials of the plaintiff would not be of the slightest use. The defendant appealed.

Judge Fenner, in giving judgment for the defendant on the claim beyond fifty dollars, said: We are clearly of opinion that this is a case where the workman has intruded his services, not only without the consent or approval of the owner, but against his will, as plainly inferable from the prior interviews between them. In such case the equitable maxim, that no one should enrich himself at another's expense, which is the foundation of the right of the *negotiorum gestor*, is without application. 11 Toullier, No. 55; 12 Duranton, No. 19; 3 Zacharie, § 441, note 15; 10 Dall. 778. See, also, *Fox vs. Sloo*, 10 A. 11; *McWilliams vs. Hagan*, 4 Rob. 374; *McCaulay vs. Hagan*, 6 Ib. 359. Aside from this, we are doubtful, under the evidence, whether the expenses, reimbursement of which is claimed, were "useful and necessary" within the art. 2299, Civil Code. The work may have afforded some temporary relief, but it is clearly proved that the work necessary to secure the roof permanently was still required, and would cost as much as if plaintiff's work had never been done. We see no merit in plaintiff's case, except to the amount of the work contracted for, and allowed by the judge *a quo*. The defence was established, and the claim should have been absolutely rejected. H. E.

Wooden Buildings in Towns.—Town Ordinance. — Municipal Power.

In the case of *Kneedler vs. The Burgess and Town Council of Norristown*, the Supreme Court of Pennsylvania, on May 29, in reversing the judgment below, decided that the authorities of towns of ordinary size have not the authority to prohibit the erection of wooden buildings therein.

On August 3, 1874, the Town Council of Norristown passed an ordinance rendering it unlawful for any person to erect a wooden building, with certain exceptions, within the borough of Norristown under penalty of fifty dollars, of which one-fourth should be paid to the informer, and in case of non-removal on notice the borough might remove and sell the materials to defray the expense of removal; that the defendant erected a building in violation of such ordinance and which did fall within the exceptions of the ordinance; that one Davis, as informer, brought suit under the ordinance before a justice, who gave judgment against the defendant who appealed to the common pleas. The question submitted to the court was whether the ordinance was constitutional. The court, considering the ordinance constitutional, entered judgment for the plaintiff, and the defendant took this writ.

Judge Green delivered the opinion of the Court and said: The charter of the borough of Norristown contains no authority to the council to enact ordinances prohibiting the erection of wooden

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buildings; nor is there anything in the grant of general powers conferred upon the borough from which such an authority can be necessarily inferred, or to which it is indispensable. We find the legislature, assuming jurisdiction over the subject in question by the Act of April 7, 1865, § 8, P. L. 329, expressly prohibited the erection of wooden buildings on certain streets of Norristown. This would have been unnecessary if the council possessed the authority to enact a prohibitory ordinance. Some inference, though not a conclusive one, may be drawn from this legislation, that in the contemplation of the legislature, the authority of that body was necessary to validate the prohibition. See *Respublica vs. Duquet*, 2 Yeates, 493. It is true in this case there is no power to proceed by indictment as there was there, but there is an equally objectionable feature in the ordinance, to wit, the forfeiture of the building erected in violation of its provisions and the power of arbitrary removal upon a mere notice of ten days without proceedings or trial of any kind. The exercise of such powers requires the authority of legislative enactment. 1 Dillon on Mun. Corp. § 279; *Phillips vs. Allen*, 5 Wr. 481; *Baxter vs. Commonwealth*, 3 P. & W. 253; *Cotter vs. Dolby*, 5 Ohio, 394; *Rosenbaugh vs. Saffin*, 10 Ib. 31; *Hart vs. Mayor*, 9 Wend. 571. It is true that as a general rule the power to impose penalties resides in municipal corporations and may be exercised without special legislative authority. It may also be true that an ordinance may be good as to the penalty and void as to the forfeiture. In the present case, the ordinance is subject to another objection which applies to all its parts, and that is that it is unreasonable and oppressive. The case stated does not inform us as to the population of Norristown, nor does it mention any special circumstances as affecting the expediency, convenience, advantage or necessity of the enactment of the ordinance under consideration. We do not know whether the houses are erected compactly or separately, nor whether building materials of wood, or of brick or stone are most accessible to the inhabitants. We must decide upon general principles only applicable to all the boroughs of the commonwealth. In many parts of the State there are towns and boroughs in which nearly all classes of buildings are constructed of wood. The chief cause of this is, of course, the greater abundance and consequent greater cheapness of that material in those localities. It must be conceded that in all boroughs where this condition of things prevails an ordinance which prohibits the erection of wooden buildings would not only be unreasonable but grossly oppressive and unjust.

It is a very familiar rule that municipal ordinances must be reasonable and must not be oppressive. 1 Dillon on Mun. Corp. §§ 319, 320, 321. And see *Commissioners vs. Gas Co.*, 2 Jones, 318; *Fisher vs. Harrisburg*, 2 Grant, 281; *Dayton vs. Quigley*, 29 N. J. Eq. 77, and cases cited in foot-notes to 1 Dillon on Mun. Corp. §§ 319, 320.

It must of course be conceded that an ordinance prohibiting the erection of wooden buildings might be entirely reasonable and not oppressive in a large and densely populated city, where the danger to life and property from fire is greatly enhanced by the presence of such structures. But this consideration is inapplicable in small towns and therefore in them the rule would be different. The question is always for the court and not for the jury. The foregoing considerations and the fact that no special circumstances are disclosed in the case stated, indicating the advantage or necessity of such an ordinance for Norristown, constrain us to treat the question as a general one, affecting all the boroughs of the commonwealth, and therefore to hold the ordinance void upon the principles above stated. The power to enact it is not conferred by the charter of the borough, nor can it be necessarily implied from any of the provisions thereof. "An implied power springs from necessity. That which may be necessary for a large city may not be necessary for a small city or borough. That which is not necessary cannot be implied." *Williamsport vs. Commonwealth*, 3 Norris, 494. It is certain that an ordinance such as this would be very unreasonable in a large proportion of the boroughs of the commonwealth, and we know of no reason why this would not be true of the borough of Norristown.

H. E.

Sale of Church Parsonage Devised in Trust. — Title of Purchaser.

In the case of *Littell vs. Wallace*, the Court of Appeals of Kentucky, in April, had under consideration the validity of the sale of a church parsonage, where the property had been devised in trust for the use of a parsonage. The legislature of the state had given the trustees the power to sell the property if the congregation advised the sale and consented to it. The court below decided that the sale was valid, and that the purchaser took a title in fee-simple from the trustees. On the appeal the judgment was affirmed. Judge Hargis, in the opinion, said: It is clear, from the provisions of the will, that the testatrix intended to invest the trustees of the church with a fee-simple to the property, for the uses and purposes expressed by her, and the will creates a valid trust, capable of being executed by the trustees and their successors, whom she designated for that purpose. The trustees and church are still in existence, capable of managing and enjoying the property devised in the mode specified by the testatrix, and certainly no reason can exist for a forfeiture in this case, and no reversion was ever contemplated by her, as she made the devise in fee-simple, subject to no condition or limitation save as to the use of the property, the trustees being in duty bound, keeping in view, in good faith, the object of the testatrix, as expressed in the will, so as to administer the trust as, considering the condition of the property and the circumstances and interests of the congregation, will best subserve the beneficent purposes of the testatrix. The testatrix did not contemplate that the particular house and lot should be used forever as a parsonage, without regard to decay or inconvenience, her main object being to furnish a parsonage, to be used and enjoyed by the members of the church and their minister. We are of opinion that a sale and reinvestment of the proceeds in other property, to be devoted to similar uses, will carry out her intention and purpose as expressed in the will, and this power of sale, aside from the legislative authority, is essential to the execution of such a trust, as the decay, unfitness or inconvenience of the house as a parsonage, might ultimately defeat the intention of the testatrix, if a sale could not be made. The sale of the property so devised cannot be made, as a matter of course, but in cases of this class, where the legislature has given the authority to trustees to sell and convey, by and with the consent of the beneficiaries, such advice and consent, when regularly given, as in this case, are sufficient to ascertain the propriety of the sale. *Stanly vs. Colt*, 5 Wall. 119; *Old South Society vs. Crocker*, 119, Mass. 1.

H. E.

PORTLAND CEMENT.[1]

SINCE my previous notes on this subject considerable progress has been made, — increased tensile value, and greater fineness of powder, producing almost unexpected results, showing that a trifling extra cost in the manufacture creates greater confidence all round. Many of the past bugbears, so fruitful of disaster, and misunderstanding, have happily disappeared, and the builder accepts with less misgiving than formerly the modern and much improved Portland cement. Some manufacturers still proclaim that they are the best judges of what a good cement should be, and disregard the advancing intelligence of the consumer, who alone should be regarded as competent to test and value so important an article, and one now entering so largely into all questions of general construction. In the absence of any authoritative standard of value, many conflicting and diverse rules and regulations — as to testing the value of Portland cement — embarrass the consumer; and although the difficulties in the way are not so formidable as in past years, they are still calculated to lead to doubt and perplexity in the mind of the ordinary or inexperienced builder.

Portland cement of good and irreproachable character can now be obtained, even under the most simple protective measures of testing, because the modern cement-maker, when he exercises ordinary precautions in his business, can produce cement competent to pass the most onerous tests without materially increasing its cost to the consumer. In the modern desire for high tensile value, many new and more careful details are obligatory on the manufacturer, and any neglect of their accurate performance prevents the desired results from being attained. It is useless to produce a highly "limed" cement if the indispensable process of fine grinding is disregarded, for although the proportions may be designed to secure high breakings, their best value cannot be reached if the powder is so coarse as to interfere with or hinder its capacity or diffusiveness. English Portland cement would still have maintained its original high character if our makers had given more heed to the important question of fine grinding; we are indebted to the modern German cement-makers for the advance made in this direction, who were in great measure forced into their present satisfactory position by being compelled to meet the requirements of a universally recognized test — not a fluctuating and uncertain one, but one fast and rigid in its specifications, any departure from or neglect of which was impossible. It will be fortunate for English makers and consumers of cement, when reasonable and common-sense rules for testing supersede the existing chaotic system, or rather systems, so clamorously upheld by their various designers and supporters. Each novice who enters upon the scene fancies that he has discovered some new infallible means of challenging a faulty cement, or insuring the acceptance of a good one. Manufacturers complain, and with a considerable amount of reason, that they are unable to keep pace with the constantly changing requirements of engineers and architects; and although they are entitled under the circumstances to our sympathy, they must not forget that it was in consequence of their supineness that engineers and others were led to impose what may be termed discordant tests. If the Portland cement, of say five-and-twenty years ago, had been at all reliable, and if the manufacturers had kept changing their lines of production in unison with advancing mechanical and chemical knowledge, they would have been able to retain the confidence of consumers, which it is evident they do not now generally possess. So much for the perplexing question of testing, which we trust will at an early date assume some more sensible and defined shape.

The question of limes has now, we may say, at last entered upon reasonable lines of discussion, for it has suddenly dawned upon the intelligences of pseudo-leaders of the constructive trades, that limes

[1] Henry Reid in the *British Architect*.

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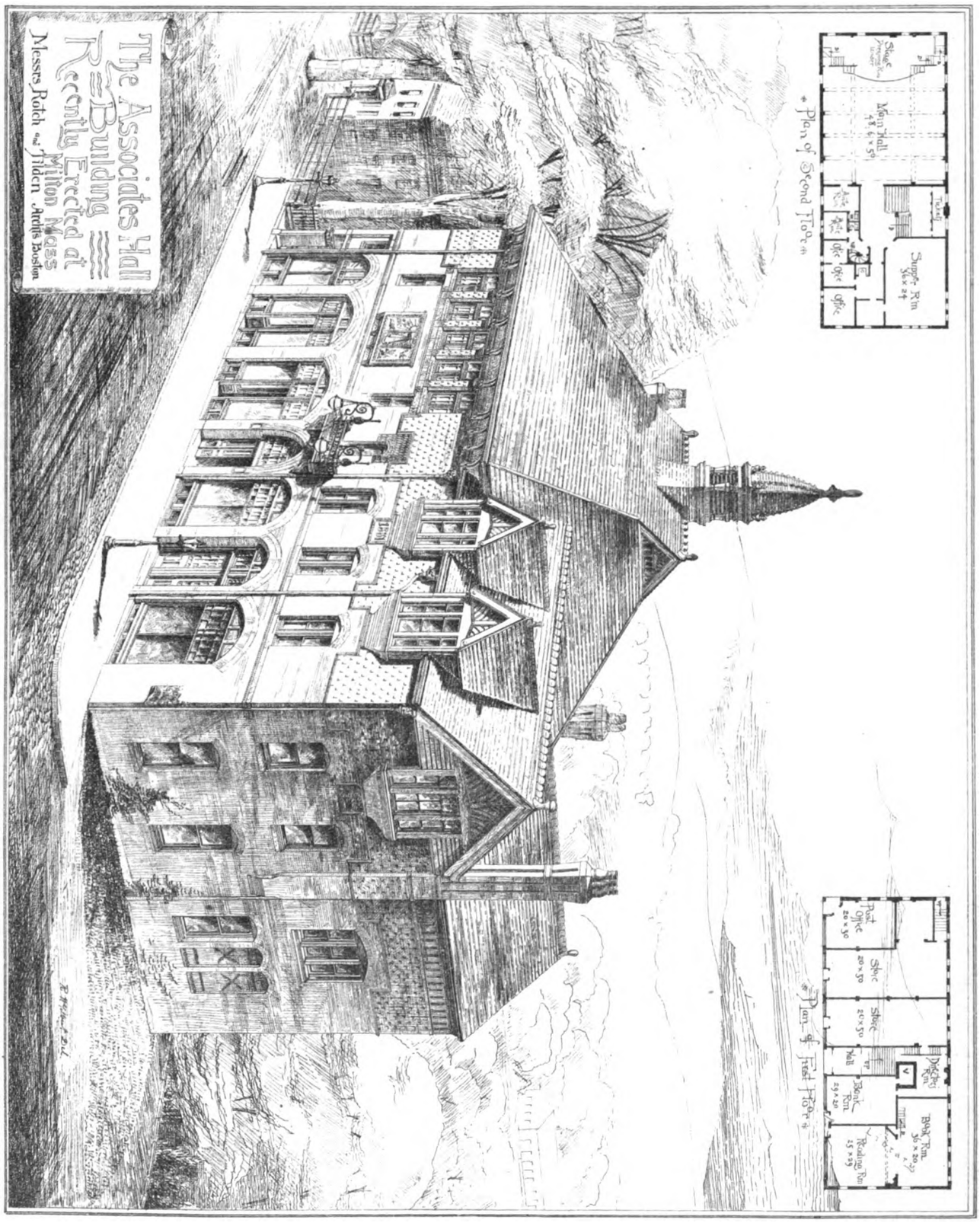

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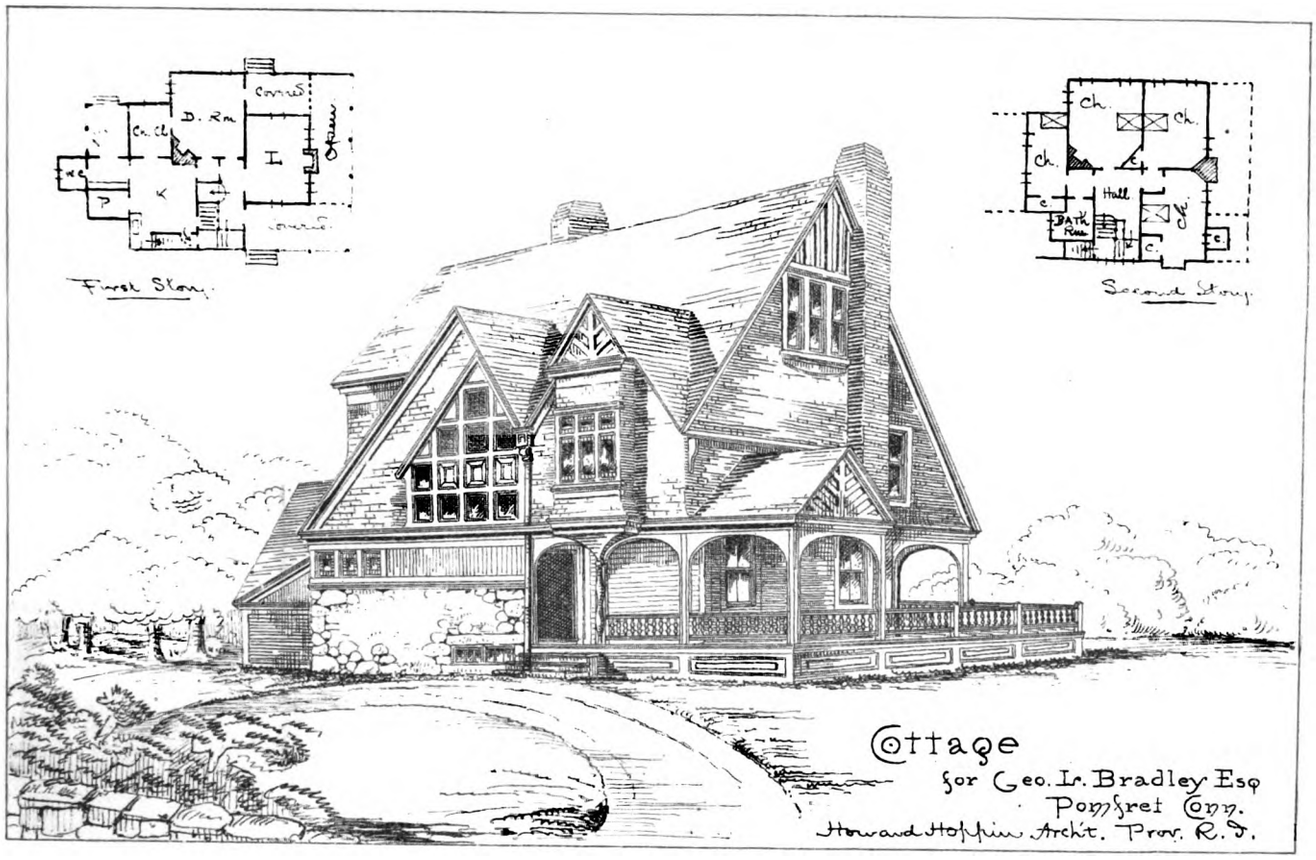
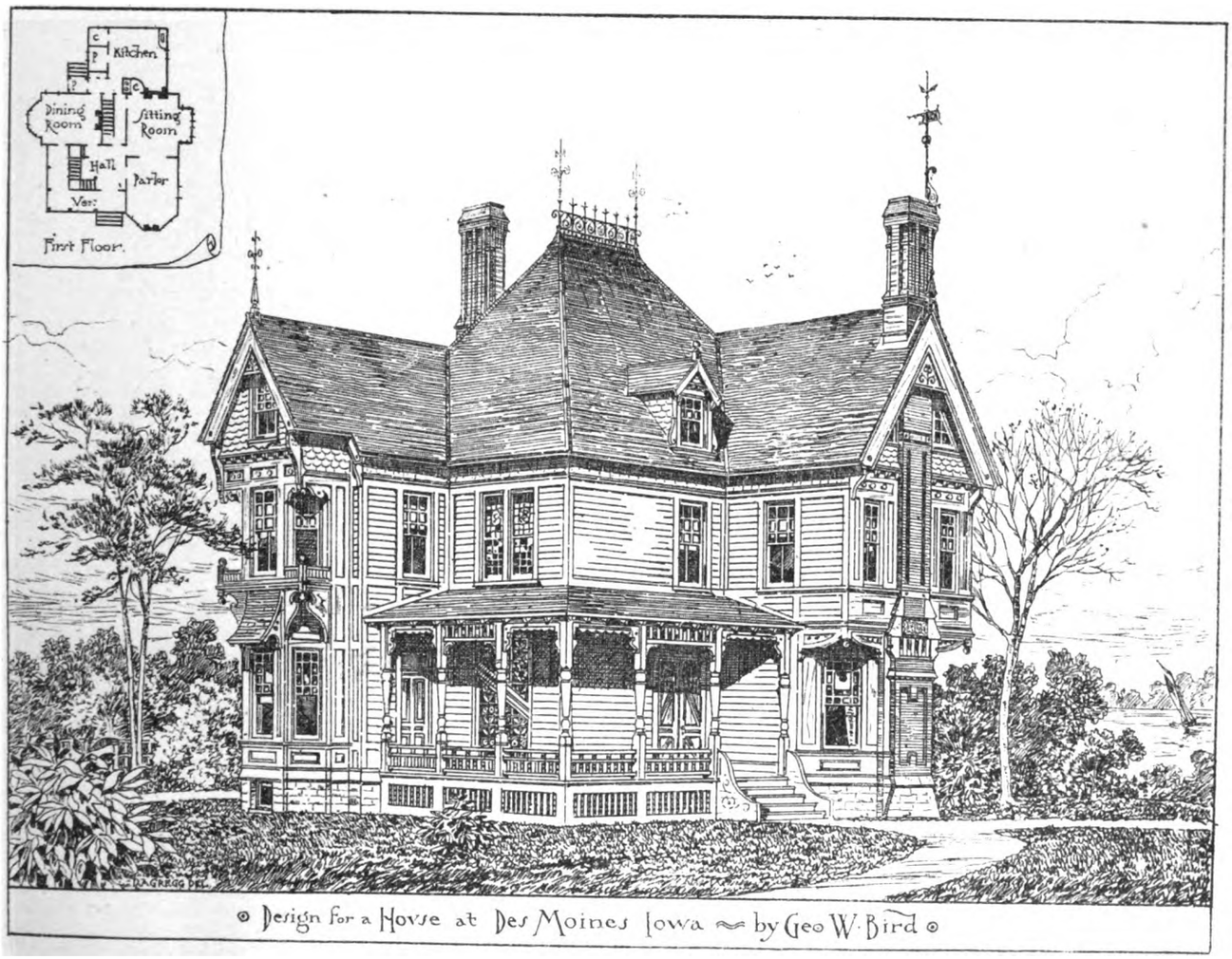


Cottage
for Geo. L. Bradley Esq
Pomfret Conn.
Howard Hoffin Archit. Prov. R. I.



Design for a House at Des Moines Iowa ≈ by Geo W. Bird

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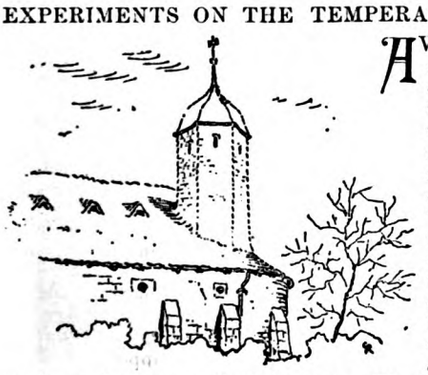
should receive an extreme amount of comminution previous to their combination with sands for the production of good mortars. Past constructive history, from the Romans during the so-called Augustan age, to the time of Smeaton, indicates too clearly that our modern system of mortar-making is opposed to the experience of the past, and as now practised by the builders of to-day contrary to, and in direct opposition to, the practice which realized sound work and substantial buildings. Lime, but more especially the fat, or rich, in a purely caustic state, possesses considerable energy when exposed to the air, and to prevent expansion of the mortar in which it may be used should be highly ground or comminuted so as to insure its thorough dispersal amongst the sand. Under the best modern treatment of limes for constructive purposes, no very satisfactory results can be said to be realized, and it is, therefore, the interest of builders to supersede their use, where possible, by that of good and reliable Portland cement. All experimenters (ancient and modern), who have directed their attention to the improvements of lime-mortars, started in their examinations with the desire to introduce some foreign ingredient of a silicious nature, so as to counteract their tendency to mechanical expansion, and at the same time render them hydraulic in character.

Aspdin, who may be regarded as the first practical producer of Portland cement, based his operations on the experience of Smeaton, who proved that the capacity of limes to set under water was due to the presence of foreign matter of varied and fluctuating character. Instead, however, of combining the lime and trass, puzzolana, or other silicious mineral, in a prepared and moist state, the Portland-cement makers treat them primarily in their pure state, and by careful mechanical combination fit them for final chemical action in the heat of the kiln.

Imperfect proportions of the raw materials (carbonate of lime, silica and alumina), or their careless combination, result in a cement under or over limed, as it is technically called,—in the one case producing a weak cement, and in the other a dangerous one, possessing the capacity of expansion. It is seldom that now, in these times of advanced or improved manufacture, that cement of the first-named kind is produced for although possessing the property of quick initial set, it could not reach any satisfactory point of tensile value. Hence the more frequent complaints of cement having a tendency to expansion, owing to its containing an excess of lime in a free or unconverted state. It is impossible to reach a high tensile value without the required and accurate amount of carbonate of lime, and careful cement-makers devote their best attention to this point. High tensile value means a full dose of lime, without which no strong and reliable cement can be produced. Portland cement may be regarded as a silicate of lime, and if it is not accurately proportioned by chemical guidance, the excess of lime, while active in character, prevents its being used. Exposure to the atmosphere will, however, reduce the danger by hydrating the lime, and rendering it thus passive in character.

These remarks will show that "cracking," or "flying" cement, as it is called, is not of the true or scientific Portland type, and the consumer should carefully examine and test all cements of this class before running the risk and danger of using them in any building. They should, in the absence or neglect of systematic testing, make up a small pat of the suspicious cement, and place it in water, where it should remain for at least seven days, and if during that time no cracks are developed it may be used. One of the most important ingredients in any scheme of testing, is that of the fine grinding, producing a powder which passes through a sieve having 2,500 meshes to the square inch. Much finer powder is now asked for by engineers controlling special and important works, and in some specifications it has to pass through a 6,400 mesh sieve. In such cases the tensile value is increased to 450 lbs. per square inch at seven days old (one day in the air).

EXPERIMENTS ON THE TEMPERATURE OF FLUES.



A VERY common way of showing the advantage of certain forms of ventilators, such as cowl-tops, and exhausts, is to make models of them and fix them on tubes of metal or glass. These experimental models are very frequently seen in sanitary exhibitions, the currents or up-draughts being indicated in the tubes by small pieces of wool, or by making smoke at the lower end of the tube. We have often had strong doubts in our own minds of the value of the smoke test in these cases, bearing in mind the well-known law of physics, that it is heat which expands and rarefies the column of air in a flue or pipe, and that unless the suctional power at the top is very strong, it cannot draw smoke out of a cold flue. These opinions have been verified by some experiments recorded by an American authority on ventilation, and which may be of sufficient interest to mention for the benefit of those readers who place great confidence in demonstrations with models. Glass tubes of about 2 feet long and 2 inches diameter were used. One of these, of the temperature of the room, was fitted into a tin box over an aperture made for the purpose, while another opening was made at the other end. A lighted taper was held first over the tube, but no current downwards was observed, and, next, over the lower aperture with the same result. A warmer tube of the same kind was substituted, and the smoke was instantly drawn down the lower opening and up through the warm tube, and out at the top. A pipe colder than the room was then tried, and it was found it condensed the air and smoke, which fell rapidly. An addition was then made to the height of the tube of the same temperature as the room, but it was found the additional height added little to the power. By placing a short tube colder than the long one over the lower opening, the smoke was found to rush down the short one and out at the top of the long one, showing that it is the *comparative* temperature that has to be taken into account. Again, by placing a short tube over the lower opening, warmer than the long tube, which is of the temperature of air, the current was instantly reversed: instead of going up the long tube, the smoke descended and came out through the short hotter tube. These experiments are sufficient to prove that the height of a flue adds very little to the ascensional force of the current, which is controlled by the temperature. If the flue is warmer than the outside air there will be an upward current established: if colder, the reverse action takes place. The form of the flue seems to have little effect also. When we consider that science teaches us that a cubic foot of air expanded by heat to twice its volume will support a column of the atmosphere 1 foot square in base, or 15 lbs. by 144 square inches, or that such a quality would rise about two miles and a half in the atmosphere before it found its level or a stratum of air of the same degree of rarefaction, it will be soon evident that variation of temperature is the chief moving power. Those who exhibit various "exhausts" attached to glass tubes apparently forget the power due to difference of temperature, and attribute too much to the suction of the ventilator. A cold flue or pipe invariably impedes the current, or the smoke is seen to hang about in it. In brick flues in summer time descending currents are often found if we sit near a chimney, and the smell of soot often becomes perceptible from this cause. The siphon-action of chimneys and ventilating tubes in connection with heated rooms can also be clearly explained on the above principles. When a church or assembly-room becomes heated the ventilating tubes are found to act the wrong way: there is a rush of air down them instead of up, the room or church forms the heated leg of the siphon, and draws the air down. The fault, of course, can be easily obviated by either warming the tubes or allowing a colder inlet of air below. They should never be placed in cold walls of brick or stone, unless they are intended to admit the cold air.

The whole of the difficulties and failures attending ventilating schemes are in a large measure due to the neglect of considering the normal temperature of rooms with respect to the outer air. The great use of exhaust appliances is to create a vacuum at the top, and thus aid in establishing a current; but if the flue is positively cold a considerable wind must be blowing across the outlet at the top to create an up-current. Flues on the windward side of houses, in gables and outer walls, are often found to produce smoky chimneys from this cause. In the summer months they are of little or no use, while in winter, on the lighting of the fire, they become down-cast shafts, and are a constant annoyance. Even a small gas-jet turned on at the bottom of a cold flue, will quickly create a current up, where an exhaust ventilator fails to act on account of the stagnation of air outside. A few well verified experiments, made by applying exhaust ventilators to warm and cold flues, noticing the velocity of the currents, would be of value.—*The Building News.*

STRAW LUMBER.

THE Legation Report on the Manufactures of the United States includes the following account of the new straw lumber industry:—There can be no question that straw lumber is admirably adapted to many kinds of finishing work, barrels, table and counter tops, fine doors, and ornamental work; and we are assured that it can be produced and sold in competition with the finer grades of pine or in competition with wide walnut, at about one-half the price of the latter. The standard manufacture is in widths of 32 inches, a length of 12 feet, and a thickness corresponding to that of surfaced boards. These dimensions may be varied to suit such orders as may be given, and embrace any width, length or thickness. Unlike lumber, however, narrower widths are the most costly. The straw lumber may be ripped with the hand-saw or the buzz-saw; may be run through the sticker for the manufacture of mouldings, and takes a nail or screw about as well as oak. It may be finished with varnish or with paint, and is susceptible to a high polish. It is practically water and fire proof, being

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manufactured under 500 degrees of heat, and we are assured has been boiled for some hours without any apparent change of structure. Its tensile strength is greater than that of walnut or oak, and its weight about one-fifth greater than the former when dry. It is made from any kind of straw, including hemp and flax fibre, — in fact, from any material that will make pulp,—and a ton of straw will produce 1,000 feet of boards. The pulp is rolled into thin sheets, a number of which, corresponding with the thickness of the lumber desired, are placed together with a peculiar cement, which is claimed to be water-proof, and are then rolled under a pressure sufficient to amalgamate them into a solid mass, which may be worked with a plane if desired.

When it is remembered that it takes one hundred years to grow a tree to maturity, suiting it for commercial purposes, — and a tree producing 32-inch lumber will require fully twice that time, — while 20,000 feet per acre is a large yield under the most favorable circumstances, it will at once be realized that where 3,000 feet can be taken from an acre of ground for an indefinite number of years, the process which enables such a result to be accomplished, and which will yield a really valuable lumber, is one of vast importance. We look for valuable results in the future in the manufacture of lumber from what is practically a waste material, but which will be produced in endless quantities so long as the United States maintains its character as a grain-producing country. The factory at the time of its destruction by fire was turning out 20,000 feet per day, and had orders for 10,000,000 feet.

WIND-MILLS.

THE increasing use of wind-mills where small power is needed at intervals, as in pumping water into a tank, or compressing air, is attracting the attention of engineers to questions connected with this class of motors, and the subject is gradually gaining a valuable literature. At the recent meeting of the Society of Mechanical Engineers, Mr. A. R. Wolff read an interesting note on the economy of the wind-mill as a prime mover, which contains some

Calculation of Wind-Mill Pumping Duty and Economy.

Pumping Duty.

Wheel.	Velocity of wind in Miles per Hour.	Revolution of wheel.	Gallons of Water Raised per Minute to an Elevation of						Equivalent actual useful horse-power developed.	Average number of hours per day during which this result will be obtained.
			25′	50′	75′	100′	150′	200′		
8½′	15 to 20	70 to 75	6.162	3.016	—	—	—	—	.04	8 to 10
10′	15 to 20	60 to 65	19.179	9.563	6.638	4.750	—	—	.12	8 to 10
12′	15 to 20	55 to 60	33.941	17.912	11.851	8.485	5.680	—	.21	8 to 10
14′	15 to 20	50 to 55	45.139	22.569	15.374	11.246	7.807	4.998	.28	8 to 10
16′	15 to 20	45 to 50	64.600	31.654	19.542	16.150	9.771	8.075	.41	8 to 10
18′	15 to 20	40 to 45	97.682	52.165	31.513	24.421	17.495	12.111	.61	8 to 10
20′	15 to 20	35 to 40	124.950	63.750	40.800	31.248	19.184	15.938	.78	8 to 10
25′	15 to 20	30 to 35	212.381	106.964	71.604	49.723	37.249	26.741	1.34	8 to 10

Economy.

1	2	3	4	5	6	7	8	9	10
Designation of Mill.	Gallons of water raised 25′ per hour.	Average number of hours per day during which this quantity will be raised.	Equivalent actual useful horse-power developed.	Expense of actual useful power developed in cents per hour.					Expense per horse-power in cents per hour.
				For interest on first cost (including wind-mill, pump and tower 5 per ct. per annum).	For repairs and depreciation (5 per ct. of first cost per an.).	For attendance.	For oil.	Total.	
8½′ wheel	370	8	.04	0.25	0.25	0.06	0.04	0.60	15.0
10′ "	1,151	8	.12	0.30	0.30	0.06	0.04	0.70	5.8
12′ "	2,035	8	.21	0.36	0.36	0.06	0.04	0.82	3.9
14′ "	2,708	8	.28	0.75	0.75	0.06	0.07	1.63	5.8
16′ "	3,876	8	.41	1.15	1.15	0.06	0.07	2.43	5.9
18′ "	5,861	8	.61	1.35	1.35	0.06	0.07	2.83	4.6
20′ "	7,479	8	.79	1.70	1.70	0.06	0.10	3.56	4.5
25′ "	12,743	8	1.34	2.05	2.05	0.06	0.10	4.26	3.2

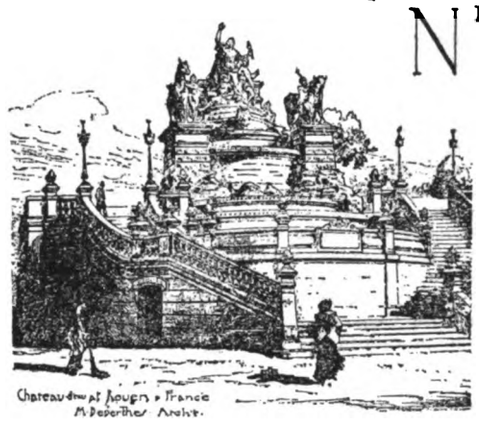
useful facts. Mr. Wolff's investigation leads to the conclusion that the wind blows fast enough to revolve the wheel during eight or ten hours in every twenty-four, on an average, but an actual running of eight hours a day is taken as a basis of estimate of duty and of cost. Fuel costing nothing, the expenses of wind-power consist principally of interest, repairs and depreciation of plant, oil, and attendance. In an automatic wind-mill the attendance is a small item, it being only necessary to occasionally fill the oil-cups, which requires no skill. Five per cent per annum is assumed to cover repairs and depreciation, and five per cent more will cover interest.

In the accompanying tables Mr. Wolff gives the result of his calculation of wind-mill pumping duty and economy.

The number of gallons pumped by the 30-foot and 35-foot mills and larger sizes, and the economy of the same, are not given in the above table, for the number of larger mills in operation is not sufficient to insure the authenticity of the results thus far obtained. The performance of the 30-foot mill, as far as observed, seems to gravitate to a pumping capacity equivalent to 2.4 horse-power, and an expense of 2.5 cents per horse-power per hour.

When the figures in the table are contrasted with the cost of pumping the same amount of water by other prime movers, where, in addition to expense of interest, repairs, depreciation and oil, there are the greater expenses of fuel and attendance, and often extra insurance on property owing to the use of steam, the economy of the wind-mill is evident.

THE FALLING MOUNTAIN AT ELM.



NEWS of another catastrophe at Elm, in Switzerland, appears in the Continental papers of the past week. Fortunately the new accident was not accompanied by the disaster which befell the village in question on the occasion of the fall of part of the mountain last autumn. On the 12th of September last it will be remembered that most of the village of Elm was destroyed by a mountain slip, such as had never occurred in Switzerland since the fall of the Rossberg, near Goldeau, in 1806. At Elm there were eighty buildings completely destroyed, and 114 lives lost. Herr Heim, who examined the Risikopf shortly after the catastrophe, states that the piece of the mountain which fell measured upwards of 1,200 feet across. The stream of rock and rubbish left after the fall in the valley was a mile long, and from 900 feet to 1,200 feet in width, while the area it covered was about 570,000 square metres. There were several blocks of rock weighing upwards of 3,000 tons hurled down into the valley from a height of 1,800 feet; and the total quantity of rock and earth which fell was estimated at from 15,000,000 to 20,000,000 tons. The geological character of the mountain at Elm is varied, one portion consisting of limestone, and another of sandstone, while, in addition, there were layers of marl and slate belonging to the tertiary foundation. The inhabitants of Elm had been chiefly occupied in quarrying the better and harder portions of this slate. In order to obtain these they had for years been blasting and removing the softer and comparatively valueless portions of the slate, so that the side of the mountain above the village was completely honeycombed with galleries. This undermining of the mountain, in fact, had a great deal to do in bringing about the calamity. After the great fall of September last year, it was soon discovered that there was still a large portion of the Risikopf in a dangerous condition. With some difficulty a cannon was got into position, later in the autumn, and for many days a bombardment was kept up at the crumbling hillside, with a view to bring it down; but without success. It was last winter predicted that within a few months that portion of the Risikopf west of the first fall would be sure to come down, bringing with it a mass of rock and earth nearly three million tons in weight. In the worst case the predicted fall would sweep away that part of the village of Elm which escaped last September.

As we have above intimated the slide which had been so clearly foreseen has at length taken place, though its dimensions proved but trifling compared with what has yet to come. It occurred on Saturday, the 10th of June. The authorities had been keeping up a regular series of measurements, in order to ascertain whether and how fast the loose part of the mountain was moving. It was found that between December, 1881, and May 1882, the upper part of the Risikopf had slipped 70 centimetres in a downward direction, while the crack which separated the moving part of the mountain from the rest of the Risikopf had grown nearly 5 feet wider. Fortunately the direction of the motion was rather more to the east than towards the village of Elm. The top of the mountain was slowly but surely separating itself from the rest. Between the 30th of May and the 12th of June the crevices at the back of the Risikopf had increased their width by 6 to 8 centimetres. The noise of the moving mass had ceased during the winter, but in the course of the month of May

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it became quite perceptible again. At length, at four o'clock on Saturday, the 10th inst., a mass of the mountain, as large as several houses in one, was observed first slowly to bend forward and, gradually accelerating its speed, it at length fell, taking the direction of the hollow which had been left by the slip of last September, and finally scattering itself over the débris left on that occasion. The fall was again accompanied by a loud crashing noise, which was clearly heard at the village of Matt, some miles away. Many thought that the whole of the top of the Risikopf had come down. In the course of the evening separate pieces of rock, earth, and stones commenced falling, and continued doing so through the night. This caused the inhabitants to withdraw from the village until the morning when the true state of things could be ascertained. Before daybreak, however, the loose stones and earth had ceased falling, and when daylight came it was seen that, notwithstanding the mass that had fallen, there was no material alteration in the general shape and contour of the Risikopf. On the following two days the mountain was ascended and examined, when it was found that a piece of the mountain of several thousand cubic metres on the east side had fallen eastward, and another smaller portion on the western side had fallen in the direction of Elm. The blocks of rock, however, had not fallen as far as the bottom of the valley.

The most important result of the investigation was that the quantity which fell on this last occasion hardly amounts to one-hundredth part of that portion of the Risikopf which is nearly ready to fall. When the great slip takes place, the mass which will come down will immensely exceed even the great slip of last September. Loose stones and earth are now incessantly falling, and the catastrophe may take place at any moment. It is found that the entire top of the Risikopf is now moving *en masse*, and the result of all the observations is to show that the whole of it will probably come down at one time, or in two or three parts at most. It was hoped that the mountain would at length settle, but this hope is now abandoned, as, since the winter, its motion has been constant. It is not yet possible to judge whether the fall of the chief mass will be towards Elm or in another direction. In any case, every day is bringing us nearer to the most tremendous landslip known in Europe for generations past. Naturally, the inhabitants of Elm are in a constant state of trepidation. In order to hasten the final catastrophe, it has been proposed to bombard the lower portion of the moving mass with far heavier artillery than that which was employed before.—[*The Architect.*

IMAGINARY COAL STRUCTURES.

WE find in the *Architect* some ingenious calculations made by Mr. Bessemer in order to help young people to realize what is meant when it is said that during the year 1881 the quantity of coal raised in Great Britain was no less than 154,184,300 tons. He says:—When Inigo Jones laid out the plan of Lincoln's-inn Fields he placed the houses on opposite sides of the square just as far from each other as to enclose a space between them of precisely the same dimensions as the base of the great pyramid of Geeza. Measuring up to the front walls of the houses, this space is just equal to 11 acres and 4 poles. Now, if my young friends will imagine St. Paul's Cathedral to be placed in the centre of this square space, and having a flagstaff of 95 feet in height standing up above the top of the cross, we shall have attained an altitude of 499 feet, which is precisely equal to that of the great pyramid. Further, let us imagine that four ropes are made to extend from the top of this flagstaff, each one terminating at one of the four corners of the square and touching the front walls of the houses. We shall then have a perfect outline of the pyramid exactly the same size as the original. The whole space enclosed within these diagonal ropes is equal to 79,881,417 cubic feet, and if occupied by one solid mass of coal it would weigh 2,781,531 tons—a mass less than 1-55th part of the coal raised last year in Great Britain. In fact, the coal trade could supply such a mass as this every week, and at the end of the year have more than nine millions of tons to spare.

Higher up the Nile, Thebes presents us with another example of what may be accomplished by human labor. The great temple of Rameses at Carnac, with its hundred columns of 12 feet in diameter, and over 100 feet in height, cannot fail to deeply impress the imagination of all who, in their mind's eye, can realize this magnificent colonnade. It may be interesting to ascertain what size of column and what extent of colonnade we could construct with the coal we laboriously sculpture from its solid bed in every year.

Let us imagine a plain cylindrical column of 50 feet in diameter and of 500 feet in height: our one year's construction of coal would suffice to make no less than 4,511 of these gigantic columns, which, if placed only at their own diameter apart, would form a colonnade which would extend in a straight line to a distance of no less than 85 miles and 750 yards—in fact we dig in every working day throughout the year a little more than enough to form fourteen of these tall and massive columns, which, if placed upon each other would reach an altitude of 7,000 feet.

But there is yet another great work of antiquity which our boys will not fail to remember as offering itself for comparison: they have all heard of the Great Wall of China, which was erected more than 2,000 years ago to exclude the Tartars from the Chinese Empire. This great wall extends to a distance of 1,400 miles, and is 20 feet in height and 24 feet in thickness, and hence contains no less than 3,548,160,000 cubic feet of solid matter. Now, our last year's production of coal was 4,427,586,820 cubic feet, and is sufficient in bulk to build a wall round London of 200 miles in length, 100 feet high, and 41 feet 11 inches in thickness: a mass not only equal to the whole cubic contents of the Great Wall of China, but sufficient to add another 346 miles to its length.

Although coal is still our great agent in the production of motive power, it must not be forgotten that Sir William Thomson has clearly shown that by the use of dynamo-electric machines, worked by the falls of Niagara, motive power could be generated to an almost unlimited extent, and that no less than 26,250 horse-power so obtained could be conveyed to a distance of 300 miles by means of a single copper wire of half an inch in diameter, with a loss in transmission of not more than 20 per cent, and hence delivering at the opposite end of the wire 21,000 horse-power.

What a magnificent vista of legitimate mercantile enterprise this simple fact opens up to our own country. Why should we not at once connect London with one of our nearest coal-fields by means of a copper rod of one inch in diameter, and capable of transmitting 84,000 horse-power to London, and thus practically bring up the coal by wire instead of by rail.

Let us now see what is equivalent in coal of this amount of motive power. Assuming that each horse-power can be generated by the consumption of three pounds of coal per hour, and that the engines work six and a half days per week, we should require an annual consumption of coal equal to 1,012,600 tons to produce such a result.

Now all this coal would in the case assumed be burned at the pit's mouth, at a cost of 6*s.* per ton for large and 2*s.* per ton for small coal—that is, at less than one-fourth the cost of coal in London. This would immensely reduce the cost of the electric-light, and of the motive power now used in London for such a vast variety of purposes, and at the same time save us from the enormous volumes of smoke and foul gases which this million of tons of coal would make if burned in our midst. A 1-inch diameter copper rod would cost about 533*l.* per mile, and if laid to a colliery 120 miles away, the interest at 5 per cent on its first cost would be less than 1*d.* per ton on the coal practically conveyed by it direct into the house of the consumer.

A SHABBY TRICK.

NEW YORK, July 29, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—We have been informed that a representative of a terra-cotta company, doing business not a hundred miles from this city, has adopted what may seem to him a very clever method for building up a reputation (?). He has with him two small pieces of terra-cotta, one of his company's make and one *chip* picked up at the New Casino on Thirty-ninth Street and Broadway, very likely selected for the purpose, which may or may not be as closely pressed as his own sample. He attempts to prove by this the superiority in texture of the terra-cotta made by his company. When one considers that over one hundred tons of terra-cotta have already been delivered at the New Casino, it is not at all unlikely a *chip* could be selected which might not be up to the standard of the general work, and this is quite likely to occur where such a large quantity is manufactured in so short a time. No concern in the business could have performed work of such elaborate character in quicker time or have given better material. It seems to us this representative is not pursuing a very honorable course in his attempts to injure a competitor in this manner, and the facts of the case, therefore, should be known by the profession generally. It would be hardly safe to trust a contract to a man who resorts to such trickery to get business.

It is for the purpose of setting right any statement which might have been made to the detriment of the work at the New Casino we desire this transaction made public.

KIMBALL & WISEDELL, *Architects.*

DRY-EARTH CLOSETS.

MONTGOMERY, July, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

CAN you or any of the readers of the *Building News* give me plans for a dry-earth arrangement to be used in privy, on which there is no patent, and oblige JOHN E. SCOFIELD.

[ANY arrangement is suitable by which a small quantity of sifted earth is thrown when required into the vault. The simplest, and in some respects the best, apparatus consists of a box of sifted loam or ashes, and a small

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hand-scoop. Another device, which is not patented so far as we know, employs a bin hung on pivots, with a tight cover, and a small service-box attached to one side, opening downward and communicating with the bin. On tilting the bin, by pulling a string, until it is turned rather more than one-quarter of the way around, the dry earth in it runs into the service-box, filling it. It will not run out of the service-box while in this position, as the orifice of this is then directed slightly upward, but as soon as the string is released the bin falls back into place, turning the opening of the service-box downward, and discharging its contents into the vault. Another apparatus of a different kind is described in a pamphlet on Rural School Architecture issued by the Bureau of Education at Washington; and any ingenious person can contrive something to serve the same purpose which he can probably use without infringing on the rights of patentees. — Eds. American Architect.]

OPEN-TIMBER ROOFS.

Washington, D. C., July 24, 1882.

To the Editors of the American Architect:

Gents, — Please advise us per next mail of some standard treatise on the *construction* for open-timber roofs, and oblige

Yours very truly, E. S. Blackwood, Architect,
615 Seventh St.

[The best work on the subject is "Open-Timber Roofs of the Middle Ages," by R. and J. A. Brandon, now out of print, but to be had of second-hand book-sellers at eight or ten dollars a copy. Address J. Sabin & Sons, Nassau Street, New York, or Estes & Lauriat, Washington Street, Boston. As to the construction of such roofs, considered as a work of engineering, there is nothing in print that we know of, although some examples, such as the Westminster Hall roof, have been the subject of published technical criticism. Practically, such roofs are very simple constructive problems. The strains are readily calculated, and for mere appearance the dimensions of the timbers are usually made much greater than is necessary to furnish the requisite resistance. — Eds. American Architect.]

FRIEDRICH THIERSCH.

New York, July 26, 1882.

To the Editors of the American Architect:

Dear Sirs, — Allow me to call attention to an error which appeared in an editorial notice of last week's *American Architect* in regard to Friedrich Thiersch, one of the prize-winners in the German Parliament House competition. The same mistake was made by the Frankfort and corrected by a Stuttgart paper, as inclosed clippings show. Thiersch was a schoolmate of your correspondent and of course a pupil of Leins, not of Semper who at that time had left Zürich. His talents were so remarkable that he easily outran all his classmates in competitions and on sketching tours.

Yours respectfully, A. F. D'Oench.

[Our information was, we believe, derived from the *Builder*. We are glad to make the correction which our correspondent wishes. — Eds. American Architect.]

A CORRECTION.

In the report of Professor Lanza's experiments in the strength of wooden posts, copied from the Boston *Transcript* in our issue for July 1, the tabular statement of the strength of spruce was incorrectly printed in the *Transcript*, and consequently in our own issue. The table should have read as follows: —

	Max.	Min.	Mean.
Hatfield gives	12,996	7,506	9,900
Rankine gives	12,300	9,900	11,100
Laslett gives	9,707	7,506	9,045
Trautwine gives			8,100
Rodman gives			6,168

NOTES AND CLIPPINGS.

Discovery of an Ancient Idol in Tennessee.—A most interesting discovery was made near Carthage (Tenn), recently. Mr. Carrol Gibbs while ploughing found a very ancient Indian idol, though the exquisite finish of the figure and its oriental posture point to its having been made by that great prehistoric race which spread over this country before the wild Red Man obtained possession. If it was made by the Red Man it was certainly made at a very early date, before he had lost those Eastern ideas which the figure shows its maker to have possessed. Upon its back is found the figures 1619, but the surface of the letters when compared with the general surface of the body shows them to have been placed there a great while after the figure was completed. It is made of compact yellow sandstone which is as durable as marble, yet time has made great ravages upon it. It is sixteen inches in height. The outlines of the features are very well preserved; in fact the face is very little damaged. It has high cheek bones, flat face and prominent chin. The arms are well shaped and well proportioned. It is represented in a sitting posture with its legs crossed in oriental fashion. There is some attempt at delineation of drapery, but time has only left the outlines, so that no definite conclusion can be reached on this score. The idol is a creditable piece of sculpture for even a highly civilized race, and was certainly made by no novice in the art. It is now in the possession of Mr. W. E. Myer, of this place, who has placed it in his large collection of Indian relics.—[*Nashville American.*

Another Case of Architectural Responsibility. — John Carson, aged forty-seven, a carpenter, hung himself with a sash-cord in an unfinished house on James Sutton's place, between Mount Kisco and the village of Bedford, N. Y., about 6 o'clock, July 12. He had been foreman for Mr. Sutton during the past two years. It is supposed that his perplexity over the planning of the new house, which is of a very peculiar style of construction, had led him to commit the act.

A Caspian and Azof Canal. — A Russian officer, Colonel Blum, has submitted to his Government a plan for joining the Sea of Azof with the Caspian Sea by means of a canal. As the Caspian is likewise to be connected with the Sea of Aral to the east, there will be a direct route from the Black Sea for trade with Khiva, Bokhara, and the other parts of Central Asia recently conquered by Russia, and those that are still independent. In ancient time, and even as late as the middle of the sixteenth century, the river now called the Amu Daria flowed through the Sea of Aral and discharged itself into the Caspian through a mouth which has subsequently been stopped up with sand. The Sea of Azof is 25 metres and the Sea of Aral is 11 metres higher than the Caspian Sea. If the proposed canal is really carried out on a sufficient scale, it will ere long be possible for vessels to steam from the Atlantic into the centre of Asia, and to the very middle of the wilds of Tartary. — *The Builder.*

A Moving Tale. — It is reported that a monster mushroom has forced its way through the solid 9-inch flooring of concrete and asphalt in a Buffalo grain-elevator. The bulge in the floor was first noticed the latter part of last week, but the break did not occur until Wednesday morning.

Tree-Planting in Kansas. — It is said that an area of 93,000 acres has been planted with trees in Kansas under the new law relating to arboriculture. The cotton tree was largely planted on account of its rapid growth, and 6,000 acres were set with walnut trees. The expectation is that this will operate, in course of time, to relieve the climate of its extreme dryness.

A New Portable House.—The rapid increase of population in Manitoba has stimulated the inventive geniuses of the Dominion to contrive houses that may be portable and quickly put up. L. Forest, of Bellville, Ont., has planned one that is in three-foot sections, and dovetails together. A house, for a hotel or boarding establishment, has been put up at Winnipeg, over 100 feet long, two stories high, and divided into apartments sufficient to accommodate 250 guests. The foundation was laid on Tuesday and the house was completed on the Thursday afternoon following.—[*Northwestern Lumberman.*

A Rock that is Poisonous.—The rock excavated on the West Shore Railroad, near Milton, on Cameron & Fagin's contract, where the big accident occurred last Wednesday, has a very peculiar quality. It is as poisonous as the ivy and some other vines, the slightest scratch by a piece leaving a troublesome running sore. The thing is quite a new experience to railroad men, and it leaves the wounds to those injured in the accident all the worse.—[*Middletown Argus.*

Recovery of a Painting by Caracci.—A valuable and interesting painting, which for years has been lost sight of, and was supposed to be irrecoverably lost, has lately been recovered at Baden, in Canton Aargau. The history of this painting, one of Annibale Caracci's masterpieces, is remarkable. The convent at Baden owed its existence to two Capuchin friars, Ludovicus and Saxonia. The members of the Diet of 1038, which met at Baden, were so impressed by the preaching of these friars that it was resolved to commemorate their services by building a convent and a chapel. The Spanish Ambassador paid for the construction of the high altar, and his master, Philip II, presented for its adornment a painting by Caracci. In 1593 the church was opened with an imposing ceremony. A century or so thereafter the painting was handed over to a local artist to be cleaned. The local artist did his work so badly that the monks, instead of replacing it in its former position, put the picture away in a lumber room. In 1841, when the convents of the Canton were secularized, the gift of Philip II was, among other things, sold by auction for a few francs. The buyer was about to turn it to use as a piece of old canvas when Herr Brunner, father of the present proprietor of the Ship Hotel at Baden, bought it from him for next to nothing, and, without having any idea of its value, hung it up in his house. A few months ago it occurred to the present Herr Brunner to have the painting cleaned and restored, and he sent it for that purpose to Cæsar, the famous picture-cleaner of Augsburg. When the thick coating of dirt and dust was removed, the identity of the painting with the renowned altar-piece of Philip II was discovered, and as it bears the artist's signature, Annibal Carracius Bononianus, and the date 1592, there can be no question that it is really the work of that master. The figures, of which there are five, are life-size.—[*London News.*

A Rotary Hammer.—Dr. W. T. Browne, of Stockton, has recently perfected a rotary engine which promises to revolutionize those branches of industry in which the hammer plays an important part. It consists of a series of hammers arranged so that their faces extend beyond the periphery of a wheel and strike a sliding rod, to which is adjusted a drill, a hammer, or a quartz-crusher, or whatever device is needed to accomplish the desired work. When these hammers strike the drill—the machine now on exhibition is fixed to drill rock—they slide off out of the way in the most remarkable manner, without perceptibly decreasing the velocity of the wheel. They spring into position again and never miss a stroke. The machine now in operation contains eight hammers, and one man turning it can deliver 400 powerful blows a minute. Two pieces of rock show the work that the machine does drilling. In freestone a man drills an inch a minute, turning the machine leisurely. A ratchet turns the drill a small fraction of an inch at each stroke, and all the driller has to do is to turn the crank. In granite rock from half an inch to an inch can be drilled in a minute. The individual hammers each weigh eleven pounds. Turning the wheel forty revolutions a minute the machine delivers 320 blows of sixty-six pounds each; fifty revolutions give 400 blows of eighty-two pounds each, and sixty revolutions give 480 blows of ninety-nine pounds each, aggregating over twenty a minute.—[*Stockton (Cal.) Herald.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

261,553. DOOR-HANGER. — David L. Jaques, Cleveland, O.

261,583. PRESSURE-RESERVOIR FOR SUPPLYING FLUSH-WATER TO WATER-CLOSETS. — Richard R. Coggin and John A. Scollay, Brooklyn, N. Y.

261,584. FIRE-ESCAPE. — Lewis Coller, Flint, Mich.

261,588. BOLT. — George Cruttenden, Jr., Montclair, N. J.

261,604. KNOB ATTACHMENT. — Oliver M. Hidden, Detroit, Mich.

261,670. DOOR-SPRING. — Malcolm Campbell, Holyoke, Mass.

261,709. AUTOMATIC FIRE-EXTINGUISHER. — Ozro C. Heath, Providence, R. I.

261,714. ELEVATOR. — John V. Hope, Wednesbury, County of Stafford, Eng.

261,720. ILLUMINATING-TILE. — Joshua K. Ingalls, Glenora, N. Y.

261,761. KNOB-ATTACHMENT. — George Price, Birmingham, County of Warwick, England.

261,764. VENTILATOR. — William W. Robinson, Ripon, Wis.

261,772. FIRE-GUARD FOR PLACES OF AMUSEMENT. — William C. Shaffer and Samuel M. Plush, Philadelphia, Pa.

261,789. LOCK. — William C. Thompson, Minneapolis, Minn.

261,797. SASH-BALANCE. — William Wimer, Union County, Ind.

261,818. WATER-CLOSET. — Geo. C. Phillips, Boston, Mass.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report twenty-six permits have been granted, of which the following are the more important: —

Mary Kemp, two-st'y brick dwell., Marshall Ave., between Wells and Winer Sts.

Chas. A. Rous, three-st'y brick building, n w cor. Biddle and Calvert Sts.

Baltimore Steam Packet Co., two-st'y brick office, foot of Union Dock.

John Scheuler, three-st'y brick building, Fremont St., between Columbia and Paca Sts.

Henry Zieget, two-st'y brick building, n e cor. Monument St. and Duncan Alley.

P. T. George & Co., four-st'y brick warehouse, Calvert St., between Franklin and Centre Sts.

Church of Ascension Parsonage, two-st'y brick building, with mansard roof, Arlington Ave., between Townsend and Lanvale Sts.

Gustavus Moore, two-st'y brick stable, in rear of Division St., between Bloom and Gold Sts.

A. J. Lightner, two-st'y brick building, s e cor. Greenmount Ave. and Biddle St.

Alonzo Lilly, 2 three-st'y brick buildings, n w cor. Madison and Bloom Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Village St., No.* 35, Ward 16, for James T. Eldredge, four-st'y dwell., 50′ x 52′; Stephen Moran, builder.

Village St., No. 33, Ward 16, for James T. Eldredge, four-st'y family hotel, 50′ x 52′; Stephen Moran, builder.

Sudbury St., Nos. 30-34, cor. Portland St., for Levi Boles, four-st'y mechanical and stores, 42′ and 44′ x 51′; Sampson, Clark & Co., builders.

Portland St., Nos. 105-113, *Merrimac St., Nos.* 50-56, *and Market St.*, Ward 7, for Wm. H. Thorndike, four-st'y lodging-house and stores, 45′ x 58′ and 60′; Chas. J. Lord, builder.

Commonwealth Ave., No. 128, Ward 11, for Samuel M. Shapleigh, four-st'y dwell., 26′ x 67′ 8″.

Commonwealth Ave., No. 130, Ward 11, for Wm. S. Rand, four-st'y dwell., 26′ x 67′ 8″.

Newbury St., Nos. 168-178, Ward 11, for Silas W. Merrill, 6 three-st'y and mansard dwells., 22′ x 55′; Silas W. Merrill, builder.

Hanover St., No. 180, Ward 6, for Mrs. M. Cotter, four-st'y dwell. and store, 15′ 6″ and 17′ x 51′; Robert R. Mayers, builder.

Washington St., rear of, near Grove St., Ward 23, for Anna C. Brodbeck, building, 18′ 6″ x 24′; John Fuchs, builder.

Kenilworth St., near Dudley St., Ward 21, for City of Boston, three-st'y grammar school-house, 65′ 4″ x 144′ 2″; John Southerland, builder.

Portland St., Nos. 1-7, cor. Hanover St., Ward 7, for Richard Stone, Jr., Trustee, four-st'y mercantile and stores, 17′ 7½″ x 95′ 3″; Wm. M. Rumery & Co., builders.

Wood. — Linden St., near Fairington Ave., Ward 25, for Jesse Tirrel, 2 two-st'y dwells., 15′ and 20′ x 50′; H. M. Perry, builder.

Sheridan Ave., near Terrace Ave., Ward 23, for Andrew Cassidy, two-st'y dwell., 22′ x 30′; James Cassidy, builder.

Tremont St., No. 1176, Ward 19, for Whittier Machine Co., iron storage, 24′ x 80′; C. Tilden, Jr., builder.

Commercial St., near Mills St., Ward 24, for John Cotter, storage, 14′ 9″ x 19′ and 24′; John Cotter, builder.

Wyman St., near Chestnut Ave., Ward 23, for Henry Vackert, two-st'y dwell., 23′ x 30′; John L. Dakin, builder.

Washington St., near Keyes St., Ward 23, for Eben Weld, two-st'y dwell., 15′ and 28′ x 30′, A. A. Ayers, builder.

Blue Hill Ave., cor. Edgewood St., Ward 21, for Daniel A. Johnson, dwell. and stores, 26′ x 42′; Henry J. Bartlett, builder.

Unnamed Pl., off Rand St., near Blue Hill Ave., Ward 20, for Bernard Foley, 2 two-st'y dwells., 20′ x 30′; ell, 15′ x 20′; Henry J. Bartlett, builder.

Elm St., near Ford St., Ward 1, for Benjamin Church, dwell., 20′ x 27′; Geo. W. Adams, builder.

Brooklyn.

BUILDING PERMITS. — *Fourth Pl., No.* 2, s e cor. Henry St., three-st'y brick store and dwell., 24′ 6″ x 43′; cost, $5,000; owner, architect and builder, Thomas Keogh, 149½ Nelson St.

Furman St., on rear No. 146 Columbia Heights, five-st'y brick tenement; cost, $12,000; owner, Isaac Henderson, 208 Broadway, New York; builders, R. L. Darragh & Co.

Warren St., No. 370, s s, about 350′ e Smith St., four-st'y brick tenement; cost, $6,000; owner, John Daly, 137 Smith St.

Dikeman St., s s, between Ferris and Partition Sts., one-st'y brick smith shop; cost, $3,000; owner, Lidgerwood Manufacturing Co., 96 Liberty St., New York; architect, J. V. Beekman; builders, P. Carlin & Son, and J. Martin.

Lexington Ave., s s, 354′ w Lewis Ave., 5 three-st'y brick tenements; cost, each, $4,000; owner, John P. Hudson; builder, F. Weeks.

Douglass St., n s, 133′ e Washington Ave., three-st'y brick and brownstone dwell.; cost, $8,000; owner, Thos. Monahan; architect, J. D. Reynolds.

Hancock St., s s, 100′ w Marcy Ave., 4 three-st'y brownstone dwells.; cost, each, $7,000; owner and builder, H. A. Weed; architect, J. D. Reynolds.

Madison St., n s, 200′ e Nostrand Ave., 5 two-st'y brownstone dwells.; cost, each, $3,500; owner, architect and carpenter, T. W. Swimm, 389 Putnam Ave.; mason, P. Costello.

Seventh Ave., w s, 20′ s Lincoln Pl., three-st'y brick dwell.; cost, $9,000; owner, H. B. Parsons, Gates Ave.; architect, W. H. Wood; builders, T. B. Rutan and J. Lee.

Fifth St., n s, 129′ e Seventh Ave., 10 three-st'y brownstone dwells; cost, each, $4,000; owner, Chas. Long, 383 Eleventh St.; builder, J. F. Wood.

Columbia Heights, s w cor. Middagh St., 3 four-st'y brownstone tenements; cost, each, $12,000; owner, Cornelius Donnellon, Pacific St., near Henry St.; architect, G. P. Chappell.

Carlton Ave., n w cor. Bergen St., 2 two-st'y brownstone dwells.; total cost, $14,000; owner, Mrs. Mary Skelly; architect, C. Werner; builder, A. Wilson.

Twenty-second St., s s, about 72′ e Sixth Ave., two-st'y brick stable; cost, $2,500; owner, Wm. Aikens, Sixth Ave. and Twenty-second St.; architect, E. C. Squance.

Main St., Nos. 64 *and* 66, w s, 125′ from Front St., 2 five-st'y brick tenements; cost, $11,000 each; owner, J. W. Knight, 114 Hall St.; architect, J. G. Glover; builders, M. J. J. Reynolds and M. C. Rush.

York St., n s, between Jay and Bridge Sts., three-st'y brick school-house; cost, $40,000; owners, Board of Education; architect, J. N. Naughton; builders, P. J. Carlin and P. F. O'Brien.

Chicago.

CHURCH. — The corner-stone of the Bohemian Catholic Church, St. Procopius, cor. Allport Ave. and West Eighteenth St., was laid July 23.

BUILDING PERMITS. — Carl Lubke, two-st'y and basement brick dwell., 24′ x 50′, 520 Eighteenth St.; cost, $4,000.

E. C. Howard, two-st'y brick dwell., 20′ x 42′, Kedzie Ave., near Lake St.; cost, $4,500.

D. F. Crilly, 9 three-st'y and basement brick stores and dwells., 75′ x 180′, cor. Thirty-first St. and Prairie Ave.; cost, $75,000.

N. Gould & Son, four-st'y and basement brick piano factory, 48′ x 50′, 2219 and 2221 Cottage Grove Ave.; cost, $3,800.

Joachim Miller, two-st'y brick dwell., 22′ x 40′, 47 McMullen St.; cost, $3,000.

Hugh Bradshaw, three-st'y and basement brick store and dwell., 24′ x 50′, 209 Lake St.; cost, $7,500.

Chas. Dehuing, three-st'y brick dwell., 25′ x 57′, 499 Sedgwick St.; cost, $6,000.

A. F. Weinberger, two-st'y brick dwell., 25′ x 50′, 27 Ewing Pl.; cost, $7,000.

K. Kromer, three-st'y brick store and dwell., 25′ x 70′, 2922 State St.; cost, $9,000.

Kirby Cider Co., three-st'y and basement brick cider factory, 540, 542 and 544 South Clark St.; cost, $12,000.

F. H. Johnson, two-st'y brick dwell., 25′ x 75, 3441 Vernon Ave.; cost, $5,500.

Board of Education, three-st'y and basement brick school-house, 78′ x 85′, Indiana and Sangamon Sts.; cost, $40,000.

Board of Education, three-st'y and basement brick school-house, 78′ x 85′, Throop and Twentieth Sts.; cost, $40,000.

Ellis Hahn, two-st'y and basement brick dwell. and barn, 21′ x 46′, Wood and Yeaton Sts.; cost, $3,000.

Foster Lamb, two-st'y brick dwell., 23′ x 60′, 81 Hoyne Ave.; cost, $4,000.

F. Kiver, two-st'y and basement brick dwell., 24′ x 56′, 526 North Halsted St.; cost, $5,000.

C. Missen, two-st'y and basement brick dwell., 22′ x 56′, 877 North Halsted St.; cost, $5,000.

H. L. Dahl, two-st'y and basement brick dwell., 26′ x 45′, 634 North La Salle St.; cost, $5,000.

B. M. Fox, two-st'y and basement brick factory, 24′ x 80′, 270 Clinton St.; cost, $10,000.

Thos. Nestor, two-st'y brick dwell., 22′ x 66′, 679 Twentieth St.; cost, $4,500.

P. M. Almini, two-st'y and basement brick flats, 32′ x 40′, 39 and 41 Walton Pl.; cost, $6,000.

James Garrett, three-st'y and cellar brick flats, 22′ x 66′, 351 Adams St.; cost, $5,000.

S. L. Robinson, two-st'y brick dwell., 22′ x 49′, 489 Belden Ave.; cost, $4,500.

C. D. & W. B. Holton, two-st'y brick store and dwell., 41′ x 48′, Cottage Grove Ave. and Thirty-seventh St.; cost, $4,000.

C. W. & E. Pardridge, 18 two-st'y brick dwells., 16′ x 60′ each, 222 Thirty-seventh St.; cost, $40,000.

Mrs. J. E. Sweatt, two-st'y brick dwell., 22′ x 40′, 3734 Calumet Ave.; cost, $3,000.

H. A. Huntington, three-st'y and basement brick dwell., 25′ x 75′, 28 Walton Pl.; cost, $10,000.

C. W. Fullerton, three-st'y and basement brick dwell., 28′ x 87′, 30 Walton Pl.: cost, $15,000.

Eliza Flaschhauer, two-st'y and basement brick dwell., 20′ x 66′, 732 Hinman St.; cost, $4,000.

J. L. Campbell, 5 two-st'y and cellar dwells., 40′ x 108′, Polk and Dekalb Sts.; cost, $15,000.

FLATS. — Mr. Wheeler is to build flats at the corner of Rush and Ohio Sts., to cost $120,000, from plans prepared by John Addison, architect. He has also plans for three stores on Wabash Ave., to cost $15,000 each.

Mrs. F. H. Johnson is to build three-st'y flats on Vernon Ave., between Thirty-fourth and Thirty-fifth Sts., from plans by W. L. Carroll.

Cincinnati.

PRICES. — Broken ashlar work laid with Ohio freestone costs about the same as the same quality of work laid with the Hill limestone. This fact was ascertained by recent bids.

BUILDING PERMITS. — Since our last report the following building permits have been issued: —

Peter B. Lanek, 2 three-st'y brick dwells, Eighth St., near State Ave.; cost, $12,000.

A. R. Von Martels, two-st'y brick dwell., No. 44 Brown St.; cost, $4,500.

John P. Shaw, two-st'y frame dwell., Gest St., near C. H. & D. R. R.; cost, $2,000.

Robt. Renolds, two-st'y brick dwell., n w cor. Addison and Plum Sts.; cost, $2,500.

Dr. Thad. A. Reamy, addition to three-st'y brick dwell., n e cor. Fourth and John Sts.; Chas. Crapsey, architect; cost, $5,500.

Mary Mocherson, two-st'y frame dwell., McMillan and Locust Sts.; cost, $2,000.

Henry Martin, addition to four-st'y brick dwell., cor. of Twelfth and Main Sts.; cost, $5,000.

C. Nelson, two-st'y brick dwell., Fourth Ave. and Centre St.; cost, $6,000.

Mrs. Jacob Finnegan, four-st'y brick dwell., 54 George St.; cost, $7,000.

H. Restert, three-st'y brick dwell., s e cor. Second Ave. and James St.; cost, $2,500.

Mrs. Mugerheier, three-st'y brick dwell., Poplar St., near Dalton Ave.; cost, $4,500.

Mrs. Jacob Fricker, two-st'y brick dwell., Brown St., near Baymiller St.; cost, $3,000.

Henry Sinnderbruck, two-st'y brick dwell., Vine St., near Moliter St.; cost, $5,000.

V. P. Evans, two-st'y brick dwell., Eighth St., near Linn St.; cost, $5,500.

Henry Tarsing, three-st'y brick dwell., 129 Woodward St.; cost, $6,000.

W. C. Peale, three-st'y brick dwell., 414 Court St.; cost, $3,500.

Eleven permits for repairs; cost, $7,000.

Total permits to date, 462.

Total cost to date, $1,293,400.

New York.

FACTORY. — For Messrs. F. C. Linde, Hamilton & Co., a six-st'y and basement brick warehouse, 50′ x 100′, is to be built on Thirty-third St., e of First Ave., at a cost of about $35,000, from designs of Messrs. H. J. Schwarzmann & Co.

ALTERATION. — The residence of Mr. Wm. S. Livingston, No. 113 East Seventeenth St., is to have exterior alterations from designs of Mr. E. Gandolfo.

HOUSE. — On the cor. of Madison Ave. and Sixty-ninth St., a residence, 34′ x 85′, of brick and Belleville stone, is to be built for Mr. A. Kuttroff, from designs of Mr. Wm. Schickel. It is to be fire-proof, with hard-wood finish throughout, and will cost about $130,000.

BUILDING PERMITS. — *Lexington Ave.*, e s, 64′ n One Hundred and Twenty-seventh St., 2 three st'y brick and stone dwells.; cost, each, $7,000; owner, Charles E. Van Tassel, Yonkers; architect, Chas. Baxter.

Seventy-sixth St., s s, 100′ w Ave. A, 2 five-st'y brick tenements; cost, each, $18,000; owner, A. H. Jonas, 152 Delancey St.; architect, Chas. Baxter.

Tenth Ave., n w cor. Sixty-first St., five-st'y brownstone tenement; cost, $20,000; owners, F. R. Heerlein and G. Reichert, 932 Second Ave.; architect, W. Jose; builders, Joseph Schreffler & son.

Tenth Ave., w s, 25′ n Sixty-first St., 3 five-st'y brownstone tenements; cost, each, $16,000; owners, architect and builders, same as last.

Washington St., s w cor. Bethune St., five-st'y brick warehouse; cost, $25,000; owner, Rubber Paint Co., Cleveland, O., N. C. Brewer, office in New York, 535 West St.; architect, Chas. Werner; builder, John Allen.

Forty-second St., s s, 206′ e Third Ave., 2 five-st'y brick tenements; cost, each, $10,000; owner, Marks Rinaldo, 220 East Thirty-third St.; architect, A. B. Ogden.

Fifty-fifth St., s s, 146′ w First Ave., 3 five-st'y brick tenements; cost, each, $10,000; owner and architect, same as last.

Eleventh Ave., n e cor. Fifty-third St., 4 five-st'y brick tenements; cost, each, $12,500; owner, Elsworth L. Striker, 360 West Fifty-first St.; architect, A. Spence; builders, John A. O'Connor & Co.

Tenth Ave., Nos. 455, 457 *and* 459, two-st'y brick church; cost, $30,000; owner, Broadway Tabernacle Society; architect, H. J. Dudley.

Centre St., Nos. 63 *and* 65, rear, three-st'y brick factory; cost, $5,000; owner, Colwell Lead Co., J. Hooper, President, 374 West Thirty-fifth St.; builder, E. Smith.

Sixty-first St., n s, 92′ w Tenth Ave., 4 five-st'y brick tenements, brownstone trimmings; cost, each, $16,000; owners, F. Heerlein and G. Reichert, 932 Second Ave.; architect, Wm. Jose; builders, Joseph Schaeffler & Son.

Seventy-second St., n s, 100′ w Madison Ave., four-st'y brownstone dwell.; cost, $40,000; owner, Anna McDonald, 271 East Seventy eighth St.; architect, Jas. E. Ware; builder, Charles McDonald.

First Ave., e s, 50′ s One Hundred and Nineteenth St., 3 four-st'y brick stores and tenements; cost,

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each, $13,000; owner, Teresa Coogan, 422 East One Hundred and Fifteenth Sts.; architects, Cleverdon & Putzel.

St. Ann's Ave., e s, 190′ s Johns St., two-st'y brick stable; cost, $10,000; owners, Ph. and Wm. Ebling, St. Ann's Ave. and One Hundred and Fifty-sixth St.; architect, Henry Piering; builder, Adam Kaiser.

One Hundred and Forty-first St., s s, 181′ e Alexander Ave., 3 two-st'y frame dwells.; cost, each, $3,000; owner, Elizabeth H. Brown, 309 East Fifty-eighth St.; architect, H. S. Baker; builder, H. Ketcham.

Eighty-third St., s s, 300′ w Ninth Ave., 2 four-st'y brick brownstone front flats; cost, each, $25,000; owner, Geo. H. Harloe, n w cor. One Hundred and Twenty-sixth St. and Fourth Ave.; architect and builder, Wm. Harloe.

North Moore St., No. 56, five-st'y brick tenement; cost, $11,000; owner, Anthony McReynolds, 209 West One Hundred and Twenty-eighth St.; architect, Wm. J. Merritt.

Fifth Ave., n e cor. Sixty-seventh St., four-st'y and mansard brick and stone dwell.; cost, $90,000; owner, Wm. H. Fogg, 359 Fifth Ave.; architect, E. D. Lindsey; builder, John J. Tucker.

Eightieth St., s s, 250′ e Second Ave., 2 five-st'y brick flats; cost, each, $20,000; owner, Washington Broas, 218 East One Hundred and Twenty-sixth St.; architect, Chas. Baxter.

Alterations. — *East Tenth St., No.* 434, repair damage by fire; cost, $4,575; owner, Wm. F. Youngs, 143 Rodney St., Brooklyn; builders, John T. Rowland and J. D. Miner.

Gramercy Pl., e s, 60′ n Twentieth St., raised 5′, interior alterations for bachelors' apartment-house; cost, $20,000; owner, Mary T. King, 31 West Twenty-second St.; architect, Joseph M. Dunn; builder, Geo. Mulligan.

East Fifty-second St., No. 7, main building to be three stories, three-st'y brick extension, also interior alterations; cost, $8,500; owner, Ogden Goelet, 425 Fifth Ave.; architect, J. M. Dunn; builders, M. Eidlitz and Geo. Mulligan.

One Hundred and Thirtieth St., n s, 100′ w Fifth Ave., two-st'y brick extensions; cost, $4,000; owner, Society Church of Puritans, G. M. Smith, chairman, etc., 58 West One Hundred and Thirty-second St.; architects, Silliman & Farnsworth; builder, not selected.

East Forty-first St., No. 48, raised to four stories, also four-st'y brick extension, interior alterations, etc.; cost, $7,000; owner, James A. Flack, 425 East Fifty-seventh St.; architect, A. B. Ogden.

Whitehall St., Nos. 15 *to* 25, repair damage by fire; cost, $8,500; owners, Robert and Ogden Goelet, 261 Broadway; architect and builder, Henry Wallace.

Third Ave., w s, about 75′ s One Hundred and Thirtieth St., Mt. Morris Theatre, new stage, etc.; cost, $4,000; lessees, Hamilton & Chandler, 114 West Forty-fourth St.; architect and builder, John Denham.

Mulberry St., Nos. 145 *and* 147, repair damage by fire; cost, $3,600; owner, Lemuel L. Fountaine, 23 Park Row.

Philadelphia.

Monthly Record. — During the month of July there were issued 395 building permits.

Building Permits. — *Snyder Ave.*, n s, w of Fifteenth St., 2 two-st'y dwells., 18′ x 42′; Clayton Allen, owner.

Vine St., near Franklin St., St. Philips Church to be replaced by business houses.

Race St., below Fourth St., German Reformed Church, is to be altered into stores; Jno. Lucas & Co., owners.

Thirteenth St., e s, n of Somerset St., 10 two-st'y dwells., 15′ x 40′; Hiram A. Miller, contractor.

Amber St. w s, s of Lehigh Ave., 2 two-st'y dwells., 12′ x 20′; Wm Dickson & Bro.

Moore St., n s, w of Front St., one-st'y church, 50′ x 50′; H. M. Martin, contractor.

Cumberland St., s s e of Ninth St., one-st'y stable, 16′ x 100′; Philip Theobald, owner.

Leverington Ave., s s between Mitchell St. and Ridge Road, three-st'y dwell., 16′ x 38′; Andrew Shinkle, owner.

Cumberland St., s e cor. Colville St., three-st'y store and dwell., 18′ x 51′; W. Schoenleber, contractor.

Collins St., n s, w of Sargeant St., three-st'y dwell., 18′ x 48′; Pat. Gallagher, owner.

Fourth St., s w cor. Wharton St., three-st'y addition to store and interior alterations, 18′ x 33′; Thos. Nesbit, contractor.

Canal St., w s, n of Girard Ave., four-st'y factory, 18′ x 92′; M. Magee, contractor.

Ward St., e s, n of Tasker St., 4 two-st'y dwells., 15′ x 28′; Peter Sheets, owner.

Shelton St., s s, w of Main St., 4 three-st'y dwells., 18′ x 46′; D. S. McNabb.

Alder St., No. 917, three-st'y dwell., 14′ x 26′; A. M. Conneen, contractor.

West York St., No. 595, 2 three-st'y dwells., 18′ x 50′; A. & G. McElwee, contractors.

Long Lane, e s, s of Reed St., 4 two-st'y dwells., 16′ x 30′; Robert McFarland, owner.

Hancock St., s w cor. Coulter St., three-st'y dwell., 30′ x 60′; Jas. Kinnear & Sons, contractors.

Leiper and Allen Sts., s e of, 2 three-st'y dwells., 14′ x 43′; Wendell & Smith, contractors.

Franklin St., s w cor. Allen St., 2 two-st'y dwells., 16′ x 42′; Wendell & Smith, contractors.

Memphis St., w s, n of Montgomery Ave., 3 two-st'y dwells., 12′ x 27′; David J. Getz, contractor.

Price St., s s, e of Main St., three-st'y dwell., 20′ x 40′; Jno. Breidling, contractor.

Germantown Ave., w s, s of Juniata St., three-st'y dwell., 18′ x 42′; Benj. Wright, contractor.

York Road, e s, s of Fisher'sLane, two-st'y dwell., 32′ x 35′; Benj. Wright, contractor.

Gorgas St., s s, e of Germantown Ave., three-st'y dwell., 22′ x 35′; W. Kohl & Co., contractors.

Mehan Ave., s w cor. Muskgrove St., 2 three-st'y dwells., 16′ x 32′; Wm. Garvin, contractor.

Thirty-eighth St., n w cor. Sycamore St., 4 two-st'y dwells., 15′ x 40′; Jas. C. Shedwick, owner.

Eadline St., s s, w of Thirty-fourth St., 6 three-st'y dwells., 16′ x 49′; J. C. Shedwick, owner.

East Norris St., No. 503, two-st'y dwell., 14′ x 40′; W. Parker, owner.

Rochester.

Depot. — Work was commenced on the new depot for the N. Y. C. & H. R. R. R. here on the 16th ult., the contract having been awarded to Geo. H. Thompson & Co., building consisting of train-house and depot, costing from $150,000 to $200,000.

Warehouse. — Contract for a large commercial building, cor. of State and Church Sts., has been awarded to C. W. Voshall; S. D. Walbridge, owner; A. J. Warner, architect.

St. Louis.

Building Permits. — Seventy-six permits have been issued since our last report, twenty-four of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Drummond Tobacco Co., two-st'y warehouse; cost, $10,000; Kirgin & Bro., contractors.

Thos. Tierney, two-st'y dwell.; cost, $2,500; J. J. McMahon, contractor.

N. Spindler, two-st'y dwell.; cost, $2,600; H. Wauschaffe, contractor.

Harmonie Club, two-st'y club-house; cost, $33,000; Isaac Taylor, architect; Wickwire, contractor.

Dr. Jno. L. Fitzporter, 4 two-st'y tenement-houses; cost, $3,200; J. J. Ryan, contractor.

Jos. Hercules, two-st'y dwell.; cost, $3,400; A. Upri, contractor.

French Silvering Co., two-st'y factory; cost, $5,000; G. I. Barnett, architect; Barnes & Morrison, contractors.

J. Whealan, two-st'y dwell.; cost, $5,000; Meagher, architect; R. M. Schmick, contractor.

G. W. Todd & Co., three-st'y storeroom; cost, $5,000; Jno. Wood, contractor.

Kupferle & Boisseller, repair three-st'y factory; cost, $3,000; S. H. Hoffman, contractor.

August Wiese, two-st'y dwell.; cost, $5,600; C. W. Rocklayer, contractor.

Mrs. Harriet Pullis, two-st'y dwell.; cost, $4,000; A. J. Cramer, contractor.

Clark & Ferguson, two-st'y dwell.; cost, $10,000; Grable, architect; A. J. Cramer, contractor.

Evans & Howard, three-st'y addition to works; cost, $9,000; McCluskey, contractor.

Mrs. M. N. Reber, 4 two-st'y dwells.; cost, $9,600; E. Hudspith, contractor.

Thos. Foley, two-st'y tenement-house; cost, $2,500; Philip Riechers, contractor.

German Evangelical Lutheran Synod of Missouri, three-st'y theological seminary; cost, $75,000; C. F. May, architect; contract sub-let.

H. Hirner, two-st'y store and dwell.; cost, $3,700; F. Mueller, contractor.

Thos. Gugerty, 3 two-st'y dwells.; cost, $12,000; Thos. Gugerty, contractor.

Dr. Pauley, two-st'y dwell.; cost, $3,000; Rocklage, contractor.

St. Louis Mutual House Building Company No. 3, two-st'y dwell.; cost, $5,900; Mortimer, architect; J. V. Majors, contractor.

D. B. Brennan, three-st'y dwell.; cost, $9,500; Brady, architect; A. McNie, contractor.

F. Nietz, two-st'y dwell.; cost, $2,500; W. C. Popp, contractor.

F. Wekerle, two-st'y dwell.; cost, $3,000; W. C. Popp, contractor.

Mrs. Finkmann, two-st'y dwell.; cost, $4,000; H. Ellermann, contractor.

J. Brungard, two-st'y dwell.; cost, $3,500.

St. Louis Mutual House Building Co. No. 3, two-st'y dwell.; cost, $3,845; Mortimer, architect; H. Wauschaffe, contractor.

St. Louis Mutual House Building Co. No. 3, two-st'y dwell.; cost, $2,720; Mortimer, architect; C. Wehking, contractor.

Ed. R. Monk, 3 two-st'y dwells.; cost, $12,000; contract sub-let.

Mrs. McCorkin, 2 three-st'y dwells.; cost, $12,700; J. B. Lindsly, contractor.

James H. Tomb, 2 two-st'y dwells.; cost, $5,000; J. Kollmeier, contractor.

St. Louis Mutual House Building Co. No. 3, two-st'y dwell.; cost, $3,254; Mortimer, architect; T. Offermann, contractor.

Washington.

Dr. L. Dorsey, two-st'y and basement brick dwell., 22′ x 32′, Massachusetts Ave., between Ninth and Tenth Sts., n w; cost, $3,350.

James M. Johnston, 2 three-st'y and basement brick dwells., 20′ x 40′, Jefferson Pl., between Eighteenth and Nineteenth Sts., n w; cost, $9,250.

James M. Johnston, remodel brick dwell., 1215 F St., n w; cost, $2,300.

S. T. G. Morsell, remodel brick dwell., 918 McPherson Sq., n w; cost, $2,000.

L. D. Merchant, 3 two-st'y and basement brick dwells., 18′ x 35′, Second St., between Pennsylvania Ave. and C St., s e; cost, $8,000.

H. P. Mills, two-st'y and cellar brick dwell., 19′ 11″ x 35′, Q St., between Sixteenth and Seventeenth Sts., n w; cost, $2,500.

Produce Exchange Co., 3 three-st'y warehouses, 19′ x 64′, Louisiana Ave., between Ninth and Tenth Sts., n w; cost, $36,000.

W. F. Reamer, 2 two-st'y and basement brick dwells., 20′ x 22′, cor. Ninth and K Sts.; cost, $3,500.

D. D. Taylor, 4 two-st'y brick dwells., 19′ x 48′, A St., between Sixth and Seventh Sts., n e; cost, $8,000.

W. B. Webb, four-st'y brick store and office, Pennsylvania Ave., between Fourteenth and Fifteenth Sts., n w; cost, $9,000.

David A. Windsor, 3 three-st'y and basement brick dwells., 16′ 8″ x 36′, Eleventh St., between K and L Sts., n w; cost, $15,000.

Weaver & Commisky, 2 two-st'y brick store buildings, 14′ x 25′, Seventh St., between D and E Sts., s w; cost, $2,300.

General Notes.

Abington, Mass. — Dr. Dickerman, a house, 23′ x 50′, twelve rooms; also, a stable; W. V. Howard, of Brockton, architect.

Avondale, O. — I. J. Freidlander is to build a limestone dwelling-house on South Crescent Ave.; cost, $20,000; Mr. Jas. W. McLaughlin, of Cincinnati, architect.

Brockton, Mass. — Ellis Packard is building a two-and-a-half-st'y house, 40′ x 70′; costing $10,000 and upwards; day work, Queen Anne style.

Capt. R. B. Grover is building on South Main St. a two-and-a-half-st'y house, 36′ x 58′, with corner tower; Queen Anne style.

Geo. H. Gould is building a house on Chester Ave., 27′ x 60′, with fourteen rooms; Queen Anne.

A. M. Herrod, a house on North Main St., 26′ x 56′, with fourteen rooms; day work.

Gardner Brothers, a house on Highland St., 25′ 6″ x 52′, with fourteen rooms.

W. V. Howard is architect for all the above work.

Cambridgeport, Mass. — The Cottage-street Methodist Society has purchased land, 7,200 square feet, for $5,500, and propose to build a new edifice.

Cape May, N. J. — Cottage for Frank McLaughlin, Esq.; Wilson Bros. & Co., of Philadelphia, architects.

Clifton, Pa. — Stone house to be erected for J. L. Bunting; size, 40′ x 55′; cost, about $10,000; J. K. Yarnall, architect, Philadelphia.

Cresson, Pa. — Alteration to cottage of Mrs. M. W. Watson; Wilson Bros. & Co., architects, Philadelphia.

Dubuque, Io. — Thos. Reddin, Esq., is building a two-st'y frame cottage on Cardiff St., to cost about $2,500.

Plans are being prepared for a two-st'y brick house for J. R. Waller, Esq., to be built opposite Washington Park, at a cost of about $10,000.

N. H. Shedenga, Esq., is preparing to build a two-st'y brick house on Main St., opposite Jackson Park; to cost about $6,000; F. D. Hyde, architect, of this city, furnishes the plans for each.

East Providence, R. I. — The committee of the Council and School Committee have selected the location for the proposed school-house.

Freeport, Ill. — L. L. Smith, Esq., is preparing to erect a frame cottage residence from plans by F. D. Hyde, architect, Dubuque, Io.

Gill, Mass. — Five new buildings, four dormitories and a kitchen and laundry, are to be built immediately at Evangelist Moody's boys' school. The buildings are to be of brick, two stories, 40′ x 42′, and capable of accommodating 100 boys. A. R. & E. S. Foster, of Keene, N. H., have the contract.

Hartford, Conn. — An Old People's Home is building in this city, from drawings of Mr. John C. Mead, architect. The structure measures 43′ x 243′, with a ward, 30′ x 96′, and is three stories high. Accommodation is afforded for one hundred and seventeen old ladies and gentlemen; the cost will be between $80,000 and $90,000.

Holbrook, Mass. — Dr. Fisher, a house, 39′ x 42′, thirteen rooms; Queen Anne; W. V. Howard, of Brockton, architect.

Kansas City, Mo. — A permit has been taken out by J. McClintock to erect a three-st'y brick dwell. at s w cor. of Sixth St. and Broadway; cost, $6,500.

Little Sandusky, O. — A two-st'y brick schoolbuilding, 28′ x 42′, is to be built; cost, $3,500; N. B. Bacon, architect. Work to begin in September.

Long Branch, N. J. — Two more residences to cost about $8,000 each are to be built for W. Liddy of New York, from designs of W. C. Romeyn of the same city.

McGregor, Io. — John Flemming, Esq., is making extensive alterations in his house, from plans furnished by F. D. Hyde, Dubuque, Io.

Millville, N. J. — A building two stories and basement to be called the "Workingmen's Institute;" size, 50′ x 60′; to contain men and women's baths, library, smoking-room and hall; to cost about $15,000; John K. Yarnall, architect, Philadelphia.

Mt. Desert, Me. — A house and stable are being built for Mr. F. W. Lawrence; Messrs. Rotch & Tilden, architects, Boston.

New Rochelle, N. J. — A large school-house is to be built, two stories and basement, to be of brick, with Wyoming Valley bluestone. The cost will be about $40,000; Messrs. D. & J. Jardine, of New York, are the architects.

Oshkosh, Wis. — The Chicago & Northwestern Railroad Company has purchased half a block on the north side of the city for the ostensible purpose of building a large depot.

Richmond, Va. — Messrs. A. Hoen and Co., six-st'y and basement building, 55′ x 57′, Bank St., bet. Eleventh and Twelfth Sts., brick, with granite and terra-cotta finish; cost, $30,000; Mr. Wm. F. Weber, Baltimore, architect.

Rockland, Me. — Messrs. Kimball & Wisedell, of New York, are preparing plans for remodelling a church.

Rosemont, Pa. — Stone mansion for John H. Converse, Esq.; Wilson Bros. & Co., of Philadelphia, architects.

Salisbury, Md. — Mr. J. J. Morris, two-st'y frame store and hall building; cost, $9,000.

Mr. J. J. Morris, two-st'y and attic frame building; cost, $8,000.

Two-st'y frame school building; cost, $4,000; Mr. Frank E. Davis, Baltimore, architect.

San Antonio, Tex. — A house is to be built for Mr. Jno. W. Brackenridge; from designs of Mr. Chas. I. Berg, of N. Y.

San Francisco, Cal. — Col. Charles F. Crocker has given instructions to Messrs. Wright & Sanders, architects, to proceed with the construction of the "Crocker Art Building," on Post St., between Kearney and Dupont.

Shenandoah Valley, Va. — A residence is to be built for Mr. Baker, from designs of Mr. Geo. Edward Harding, of New York.

South Abington, Mass. — H. H. Jenkins is building a house, 27′ x 58′, with fifteen rooms; also a stable, 30′ x 42′; N. S. Holmes, of Brockton, contractor.

G. L. Paine, a house, 24′ x 52′, eight rooms; also, a stable, 25′ x 34′.

Geo. Reed, a house, 23′ x 52′, twelve rooms.

W. V. Howard, of Brockton, is architect of all the above.

Spring Lake, N. J. — Mr. Thos. Beaver will build 3 cottages, to cost $8,000 each; J. K. Yarnall, of Philadelphia, architect.

St. Paul, Minn. — Plans are being drawn for a brick and stone house to cost $20,000, by Mr. H. R. Marshall, of New York, for Mr. R. D. Noyes.

(Continued in Supplement, page 4.)

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co. No. 346.

AUGUST 12, 1882.

Entered at the Post Office at Boston as second-class matter.

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A SEVERE outbreak of typhoid fever which occurred last year at Nahant, a rocky peninsula near Boston, inhabited during the summer by a small number of very rich cottage-owners, was followed by an investigation of which the results are made public in an article by Mr. E. W. Bowditch in the *Boston Medical and Surgical Journal*. In such cases contamination of drinking-water is usually the principal cause of the spread of the disease, and the wells and cisterns which supply the houses were first examined. Water was taken from one hundred and ninety of these and analyzed. Eight of the samples were pronounced "excellent," and seventy-one others "permissible," or "good." One hundred and eleven were classed as "suspicious," "very suspicious" or "bad." About eighty cases of fever occurred, nearly all of which could be accounted for by the actual condition of the drinking-water used in the houses inhabited by the patients. In a few others the filthy surroundings furnished a probable source of infection, although the water appeared pure, as in one instance, where analysis failed to detect any serious pollution in water taken from a well situated within ten feet of one leaching cesspool and fifteen feet of another, both overflowing, and of course ready to furnish an occasional supply to the well during dry seasons or under other circumstances. One or two more were probably explained by the fact that the ice used in the household was brought from a foul pond in the vicinity; and only one seemed quite inexplicable, unless perhaps the infection might have been brought by milk contained in cans which had been rinsed in foul water. Mr. Bowditch's suspicion, that the infection was communicated in certain cases by contaminated ice, is strengthened by the fact that a very severe and fatal epidemic of typhoid fever was unquestionably caused in this way not long ago at a seashore hotel in New England; and it is worth asking whether the public authority might not be employed with advantage in exercising some sort of surveillance over the collection and sale of an article which may become, and perhaps already is, far more dangerous than the trichinous pork, or immature veal, against which so many precautions are taken. In one place that we know of thousands of tons of ice are annually gathered at the very edge of an extensive and well-filled cemetery, which slopes somewhat rapidly toward the water; and we have seen the winter product of a little pool formed by the overflow of what was practically the drain of a cluster of squalid houses regularly sold to customers.

SOME one connected with the Pennsylvania Academy of Fine Arts possesses a remarkable talent for what we may call executive enterprise, as well as a great familiarity with the opinions and habits of artists. The exhibition of the Academy for 1881 was made signally successful by the happy thought of inviting contributions from American artists living abroad, and this season the invitation is to be repeated. Next year some novelty will be acceptable to the public, and this has already been provided for in the shape of a competition, open to all American artists, for a picture upon a subject suggested by some incident of the Revolutionary War. Prizes of money are to be given, together with medals of gold, silver, and bronze. The choice of judges will be the most difficult and important part of the scheme. According to the New York *Times*, the jury is to be made up of connoisseurs, to be chosen, perhaps, from the principal artistic societies, but is not to include any professional artist. With all possible deference to the wisdom of the managers of the Academy, we hope that they will think twice over the matter before making such a decision. Important as it is to exclude the influence of the local and personal jealousies of artists, the whims and prejudices of connoisseurs are still more earnestly to be guarded against, and the award of such a jury would command neither the respect of the artists nor of the public. It is a maxim much despised among us, but true nevertheless, that the way to understand an art thoroughly is to study and practise it, not to read about it in books, or to have "thoughts" or "aspirations" in regard to it; and none are more likely to be thrown off their balance by a name, or what is the same thing, a characteristic manner, than those who know enough to recognize the touch, but not much more. If the Philadelphia Academy wishes to make its competition really successful, it might well imitate the French plan, and have the jury chosen by the ballots of the competitors. Probably it would be best to have the votes cast only by actual contributors, and their suffrages might fall on some of the competitors themselves; but there are few artists who would not regard such a selection, with the honor of having their pictures shown with the mark "H. C.," as quite equivalent to a prize, and the great object in such contests, an award which no one could question or dispute, would be secured.

A SIMPLE way of cooling the air of a room is described in the New Orleans *Picayune* of a recent date. The composing room of the *Picayune* is situated in the upper story of its publication house, just under the roof, and in summer is extremely hot. This season an inspiration seems to have come to one of the oppressed occupants, and in accordance with it a vertical wooden box was constructed in the corner of the room, with openings at the floor and ceiling, and furnished with a pipe for supplying water at the top, and a pan and drain at the bottom for receiving the flow and carrying it safely away. The supply-pipe was bent over the upper end of the shaft, and fitted with a rose like that of a watering-pot, so as to deliver a shower of spray instead of a solid stream. On connecting it with the service-pipe, the movement of the water was found to cause an active circulation of the air in that part of the room, which was drawn in at the upper opening of the shaft and issued again, cool and fresh, at the floor level. The most surprising thing about the experiment seems to have been the effect of the water in cooling the air to a degree much below its own temperature. With Mississippi water which when drawn from the service-pipe indicated a temperature of eighty-four degrees, the air of the room, in which the thermometer at the beginning of the trial stood at ninety-six, was cooled in passing through the length of the shaft to seventy-four degrees, or about twenty degrees below the temperature at which it entered, and ten degrees below that of the water which was used to cool it. Of course the absorption of heat by the evaporation of a portion of the water accounts for its refrigerating effect, but the result seems to have been so easily and inexpensively attained that the experiment would be well worth repeating in other cases.

THE *Scientific American* calls attention to certain risks attending the use of incandescent electric lamps, which are generally supposed to be incapable of setting fire to anything. Quite recently an employé in a Philadelphia drug-store, in which Maxim lamps were used for lighting the basement, discovered the wires of one of the lamps at a white heat, while the paraffine with which the insulating covering was saturated was blazing up against the floor-beams above. Seizing an axe, he promptly severed the wires, and on investigation discovered that one of them had become detached from its connection with the brass shell of the lamp, to which it seemed only to have been tied with a bit of copper wire, and dropping down had come in contact with the other wire, establishing a short circuit through the inflammable insulating substance, which set it on fire at once. Two or three other lamps were found in which the wires were held insecurely, either from careless

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original construction or through the melting of the drop of solder which was intended to keep them in position. In another Philadelphia store, where Jablochkoff candles were used to illuminate the front windows, a careless attendant forgot in adjusting the candles to screw on the brass cup which is usually placed below them, and as soon as the current was turned a shower of sparks and incandescent particles fell from the candles upon the light goods below them, which instantly burst into a blaze.

A meeting was held in Berlin last month which seems to have been remarkable in more than one way. A rumor having become generally current that some German manufacturers of Portland cement had adopted the practice of mixing their product with various foreign substances, such as ground chalk, limestone, trap, and blast-furnace slag, a special session of the Association of German Cement Manufacturers was called to consider the report. The importance of the subject, according to the *Bauzeitung*, brought a large number of manufacturers and dealers to the meeting, which was presided over by Herr Doctor Delbrück-Stettin. The question to be debated was immediately announced, — whether the mixture of foreign substances, particularly of iron slag, should be considered an improvement or an adulteration of the compound known as Portland cement. In regard to such substances as gypsum, trass, and limestone, the opinion of those in attendance was practically unanimous, that except in very small quantity they injured the quality of the cement to which they were added, but the admixture of iron slag was defended by three members, two of whom were directors of a large manufactory. These claimed that the latest investigations showed the addition of ground slag to be useful in increasing the tensile strength of the cement, as well as in reducing the tendency to shrink or swell after setting. They claimed therefore that such an addition could not properly be called an adulteration of the cement, and wound up by the suggestive declaration that in order to enable German cement to keep the markets of the world against English competition it was necessary to sell it more cheaply, and that the mixture of slag afforded a means of reducing the cost of production very materially. It is creditable to the other manufacturers that they opposed these arguments with energy. If the addition of powdered slag increased the strength of cement, it was, to say the least, strange that no one else had heard of it, and the general opinion was that its effect, if it had any, could only be that of other inert powders, which often increase the apparent strength of clear Portland cement by furnishing an aggregate around which the active particles of cement can group themselves, but really serve only the purpose of so much sand, and detract accordingly from the value of the cement when used in mortar. The sale of German cement, moreover, the other manufacturers contended, now depended, not on its cheapness as compared with the English brands, but on its undisputed superiority, and any attempt at lowering its cost at the expense of its quality would result in casting distrust over the whole manufacture, since it would be almost impossible to detect adulteration of this kind without chemical analysis. A resolution was then adopted, declaring that the sale under the name of Portland cement of a product to which foreign substances of less value than the cement had been added after burning should be considered as a fraud upon the purchaser, unless distinct information were given him of the character and proportion of the admixture. The addition, however, of foreign substances to an amount not exceeding two per cent by weight of the cement, in order to give it special properties, would not be considered to be an adulteration within the meaning of the resolution. The executive committee of the Association was empowered to take such steps as it should deem proper for making known this action to other cement manufacturers and the public.

According to the investigations of M. Chatellier, who has studied with the microscope the phenomena of the setting of cements, the main element in the process is the crystallization of various compounds of silica, lime and alumina. In the aluminous cements, which include Portland, Rosendale, and most other varieties used in masonry, the setting is accompanied by the formation of a very great number of long, needle-like crystals, which interlace in every direction, and evidently serve to give great tenacity to the mass. These crystals contain a considerable proportion of water, some of which may be removed by evaporation without destroying their form, both these indications agreeing perfectly with the theory of setting generally accepted. With some non-aluminous cements crystallization was observed to take place in hexagonal plates, the interlacing of which may have an effect similar to that of the spicular aluminous crystals.

Something of a novelty in competitions is announced in *La Semaine des Constructeurs*. The Municipal Council of Paris, having resolved to erect a statue of that picturesque individual, Etienne Marcel, on an open space near the river, invites sketches, at one-tenth the full size, which are to be delivered at the city offices in the Champs-Elysées, on or before December 5 next. After a public exhibition of ten days the jury will select three sketches, whose authors are then to prepare models at one-third the full size, and from these models a second selection will be made. The author of the model placed first in this trial will be entitled to the execution of the work at the usual commission. The second in rank will receive a premium of five thousand francs, and the remaining one will receive four thousand francs. The design and execution of the pedestal is to be confided to an architect to be chosen by the victor in the competition for the statue. We venture to predict that this invitation will call forth something better than the Nightmare-Mauresco-Japanese designs which have so afflicted the art-loving souls of the subscribers to the San Francisco Garfield Memorial, and although the awards offered to the successful competitors may seem lavish to the frugal Californians, the Parisians willingly pay them for the sake of obtaining a monument which they are sure will not expose them to the derision of strangers.

We have received another letter of inquiry from a participant in the competition for the Cleveland School-House, who says that he has received no acknowledgment of the receipt of his drawings, and no advice as to the result of the competition, and he appeals to us "to protect the members of the profession from such lawlessness as appears to have been perpetrated." Concerning the result of the contest we are in a position to satisfy him. At a meeting of the Cleveland Board of Education, held June 5, 1882, the joint committee appointed to examine the competing plans presented a report in which it says among other things that "there seems to have been a lack of understanding by many of the competitors of the details of school management in our city, and most of the designs suffered for that reason. For instance, one of the best designs not accepted showed that the author expected the girls and boys to occupy different parts of the building, entirely separate from each other, and several of the plans contained serious defects, necessitated by providing separate cloak-rooms for boys and girls." These and other defects led to the rejection of nineteen out of the twenty-four plans, and of the remainder one bearing the motto "*Palmam qui meruit ferat*" was subsequently unanimously chosen as the best, and was recommended for adoption, subject to certain modifications. We suppose that some of our readers will ask whether such eccentric "details of local school management" as the provision of common dressing-rooms for boys and girls might not in fairness have been mentioned in the circular of instructions to competitors, so as to put the architects at a distance who accepted the general invitation on an equality with those nearer the scene; or whether those who undertook to prepare designs without a knowledge of such details did not simply throw away their time and money from the first; and to these questions we confess that we can find no satisfactory reply. Some of the competitors, we hope, are sufficiently rewarded by the experience they have gained for their pecuniary loss, but those who need another lesson can easily obtain it by engaging in the next competition of a similar kind, that is, in which the jury are to be persons outside of the architectural profession. So long as architects consent to send designs at random to be judged by laymen, they must put up as best they can with the losses and mortifications which inevitably follow; and if they feel themselves aggrieved by the apparent contempt with which their work is in such cases generally treated, they may as well reflect whether they can expect others to put a greater value upon it than they apparently do themselves.

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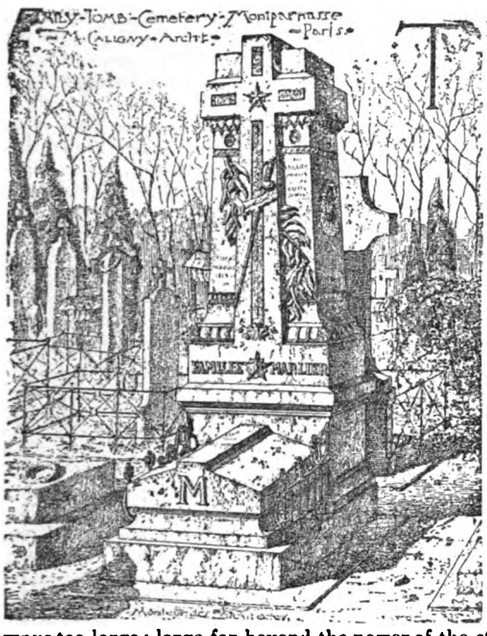
NOTES ON HOUSE-DRAINAGE. — III.[1]



THE most serious defects in the better plumbing work of the present day lie in the leaky joints of soil-pipes, in a great complication of the work, and in the attendant great multiplication of plumbing conveniences, leading to a multiplication of outlets, waste-pipes and overflow pipes from the various basins, bath-tubs, sinks, etc., which are so widely distributed throughout the house. These outlets are almost always too large: large far beyond the power of the stream they are to carry to keep them clean, and supplied with traps which are almost invariably what they are called in Scotland, "cesspools." The moment we descend from work of the very best class to that done by ordinary plumbers, especially on contract jobs and in houses built for sale, the whole system is riddled with imperfections. Wherever the saving of money is a leading object, and especially where this is coupled with the desire to make an attractive house for sale, skimping and scamping are the rule, and weakness and danger are the necessary results. Another defect which perhaps it would not be improper to put at the head of the whole list, and one which is rarely absent from any house, is not at all the fault of the plumber, but of the architect and the builder. The whole system of soil-pipes, water-closets, branches to distant basins, etc., and the arrangement of these appliances themselves, constitutes necessarily a sort of venous system running parallel with the arterial system of supply-pipes, from each point where water is used to the ceiling of the cellar, where the pipes are located in a cluster. So far as the location of the pipes themselves is concerned this is of course proper; but the whole arrangement leads to a free and open communication between the cellar, the urine-slopped spaces about water-closets, and the leakage and dust and untidiness under kitchen sinks, and basins and baths, and the whole hidden space in the house between floors and ceilings and behind partitions. Ordinarily everything is boxed in tightly so that its condition cannot be seen, so that there is no local ventilation, and so that the air tainted by the sources above indicated is diffused throughout the interior space of the whole house, escaping by every crack in wood-work and plaster. The difficulty in this case is not an easy one to remedy. At the same time it is possible so to close the openings through which pipes pass from the cellar and from floor to floor that there shall be no communication of air from one story to another, and no lateral communication in the spaces under the floors. If to this there be added an entire exposure or a very thorough ventilation of all spaces under sinks, wash-basins and water-closets, and about soil-pipes, all tendency to taint will be neutralized at its source.

It is not proposed that these notes shall be in any respect a treatise on the draining of houses. We have already a sufficient cataloguing of the various appliances and processes of the art. I shall notice here only such methods and such apparatus as seem to me to be the best for use under different circumstances and at different scales of expense. The selection will be made, of course, only according to my own judgment, and there will necessarily be omitted many things which I consider entirely safe and admissible. In this connection there arises a certain embarrassment due to the fact that nearly everything that is good in plumbing is patented, and that I am myself interested in patents protecting some of the articles recommended. It is quite possible that in some cases I give the preference to devices of my own which, were I not biased by personal interest, I might not consider better than some of their competitors. All that I say on this subject must, therefore, be taken with this qualification. It is, however, proper for me to say that during the many years that I have devoted to sanitary engineering I have naturally had always in mind the improvement of the appliances and conditions of the work. As my motive has been professional rather than philanthropic I have patented whatever has seemed to me to be important. Some of these inventions have been abandoned and withdrawn from the use for which they were intended. Others I have done my utmost to promote as a matter of business. Some writers, notably the editor of the *Sanitary Engineer*, assume that an article which is protected by a patent ought not to be recommended or referred to in papers written for the information of the public. There is a strong sentimental justification for this view of the case, but another view which seems to me to have weight is that the first duty of a writer is to give his readers the best and latest information on the subject of which he is treating, and that he does less than his duty if he withholds from them the knowledge of new and valuable improvements, whether patented or not. This consideration seems to me a controlling one, and, while recognizing the criticism that may well be raised on the score of good taste, I shall act upon it in these papers. Everything that is new and good being patented, I think that the sensitive policy of that able journal, if consistently carried out, is open to the criticism that its information must always be to a great extent seventeen years behind the times.

[1] By Geo. E. Waring, Jr., Newport, R. I. See *American Architect*, Nos. 342 and 343.

PRACTICAL DETAILS.

The manner of disposing of the wastes of a house after they shall have passed through the foundation-walls, that is, the construction of the drain which is to carry them to the public sewer or to another destination, will be discussed and illustrated at the close of these papers. We will first consider the interior work of the house in detail.

CELLAR-DRAINAGE. — Storm-water, or what is the same thing clean water escaping from the ground about the cellar of a house is not, it is true, a waste of domestic life, but its treatment is so generally a necessary part of the work of a house-drainer that it should be considered in this connection, and, along with it, the exhalation of moisture from a damp soil under or about the house, or a dampening of the foundation-walls in contact with earth which while damp may not be so saturated as to deliver a stream of water into the cellar.

A common method of cellar-drainage is to lay drains, usually of considerable size and in various directions, under the cellar-bottom, and to deliver their flow to the sewer or house-drain through an intervening "mason's trap," — a large box of brickwork with a dip-stone. This trap, being also used for the discharge of surface-water of the cellar, is brought into communication with the house. It is usually so circumstanced as to become foul from the accumulation and decomposition of organic dust and from the absorption of the foul air of the outer drain with which it is connected, so that it is often more than a minor source of tainted moisture in the air of the cellar. This form of trap is a very persistent survival of a system of drainage most of whose details have been condemned and abandoned. Here, as well as anywhere else about the premises, it is important to restrict the dimensions of the trap as well as of the drain, very nearly to what is necessary for the office to be performed. If a tight cellar were surrounded by a porous soil filled with water to its surface, a hole through the cellar floor one inch in diameter would admit a sufficient stream to fill it in a short time. On the other hand, if a tight cellar standing in a porous and well-drained soil were filled a foot deep with water, and if its bottom were pierced with a hole the size of the finger, in a few hours it would become dry. I have never seen in the excavation of a cellar, save where there was a vigorous rock spring, such an amount of water running into it from all sides as would fill a one-inch pipe. I have never seen a cellar which could not be perfectly drained by the smallest tile, nor have I seen a case where the smallest trap was not amply large for the purpose. I should therefore advise in all cases that the subsoil drainage of a cellar be done with the smallest tiles available. While an ordinary water-trap is a sufficient protection where there is a constant dampness sufficient to counteract evaporation, this condition of constant saturation is so rare that it is wise, in view of possible drying of the trap during the summer, to deliver the cellar-drain into a barrel or cask of coarse sand or fine gravel having an outlet above the level of the inlet to carry off the water as it rises in the porous material. This will most effectively prevent the return of the air of the outside drain to the drain under the cellar. Ordinarily the best position for a cellar-drain is around the foot of the entire foundation and about two feet inside of it, the tile being laid, where a sufficient outlet can be secured, from one to two feet below the bottom of the footing. If properly laid at this depth, with the joints well secured against the intrusion of sand and loose earth, the drain need have no fall: it will deliver what it receives with sufficient rapidity if laid level. Where the excavation is in rock, leaving the bottom irregular and with seams which may distribute water under different parts of the cellar, the depressions should be connected by channels cut for the purpose, and the whole space should be brought to a certain level with a uniform filling of gravel or other very porous material, this stratum, which will serve as a universal drain, being connected with a line of tiles extending a few feet inside of the foundation wall. The cellar being drained according to either of the above methods, it is ready for any treatment which would be given to a permanently dry bottom. Perfect work would include an asphalting of the outside of the foundation-wall, and a concrete bottom covered with an asphalt flooring, but details concerning this portion of the work would be out of place here.

THE SOIL-PIPE. — There is no doubt that the adoption of cast-iron in the place of lead for soil-pipes marked a great and important advance in the right direction. Lead is, for more reasons than one, a material the use of which should be reduced as much as possible in disposing of house-wastes. Cast-iron of sufficient thickness, especially when properly coated with tar or enamel outside and in-

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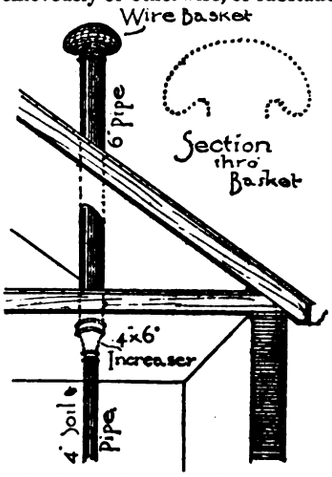
side, is much better. Until quite recently I should have said that a soil-pipe jointed with caulked lead was one of the complete elements of satisfactory house-drainage. Recent experience in testing such pipes, by closing their outlets and filling them with water, has led to the conclusion that of all the lead-jointed iron soil-pipe now in existence in American houses, not one in a hundred would fail to leak a considerable amount of water under this test; that not one in fifty would fail to leak badly at many points; and that not one joint in ten is perfectly tight. I have recently had occasion to test the soil-pipes of a large house of the best class, where the greatest effort was made to secure tight work, where the joints were so exposed that there was no difficulty in caulking them thoroughly, and where there was every reason to suppose that every joint was absolutely tight. On closing the outlets and filling the pipe with water, the whole system leaked like a sieve. Owing to the height of the building the pipes were divided into two sections in order not to apply an unfair strain in the lower portions. My assistant in charge of the examination reports with regard to the upper section: "A joint that does not leak badly is an exception." In some cases in driving up the caulking to make the joints tight the pipes were split owing to cracks previously existing and which a casual hammer-testing would have discovered. This result puts an entirely new aspect on the whole question, and points clearly to a radical defect of the manner in which all of our soil-piping is done. As an inheritance from the old custom of laying socketed vitrified pipes for drains, it is the custom to put the socketed end of the soil-pipe at the top, the spigot end passing an inch or more below the top of the socket. With this arrangement, any leak that may exist will not be disclosed in ordinary use by an escape of water. Indeed, the pipe would carry its water completely with no packing of the joints. The making of the joints is much easier if the lead can be poured in at the top instead of being made to rise from a clay dam below, and generally the caulking may be most easily done from the top. These considerations perhaps warrant a continuance of the old arrangement; but it is clear that very much more thorough work must be done, and especially in the use of light soil-pipe. Sufficient strength for thorough caulking can be secured only by increasing the thickness of the hubs. So far as the architect and the owner are concerned it is not necessary to go farther than to insist on the water-pressure test being applied and the perfection of joints being thus demonstrated before a single pipe is covered from sight. The test should have for its object not only the testing of the joints, but also of the absence of cracks and sand-holes, which are by no means exceptional. Work which has not passed this ordeal cannot be trusted, whether in an old house or in a new one: work which has passed it may be trusted to be and to remain perfectly tight, the tendency of use and age being to fill existing crevices and leaks with rust rather than to increase them.

The iron soil-pipe should extend from a point well outside of the foundation-wall, at least several feet beyond any excavation and refilling, where settlement is almost certain to occur with sufficient force to disturb the cement joint of an earthenware pipe. Wherever it is possible to avoid placing a water-closet or other vessel at the level of the cellar-floor, the soil-pipe should pass through the foundation above that floor, and should be carried along the wall, or should be supported from the ceiling to the point where it turns up through the house. In its vertical course it should be exposed to view so far as possible throughout its entire length, though if it has been shown by the water test to be perfectly tight, it may, at points where it would be unsightly, be concealed behind a casing or enclosed in a wall. It should continue of its full diameter to a point near the roof of the house, or at least to the garret or attic floor. From this point it should be extended through the roof with an increased diameter. At least five feet of its upper end and all of it that passes through the roof or that is exposed to excessive cold should be fully six inches in diameter. The elaborate experiments at Kew, referred to above, established the fact that the most efficient means for securing a *constant* increased movement of air through a pipe is to increase its diameter at the top. Another controlling reason for this increase of diameter in all northern climates lies in the fact that the vapors rising through the soil-pipe are in cold weather congealed and deposited around the interior circumference, so that it is by no means unusual to find a two-inch pipe entirely closed and a four-inch pipe so much reduced in diameter as to have its ventilation very seriously interfered with.

The market is filled with stationary and movable ventilating cowls in great variety. All of these that have come to my notice are objectionable. All of them under certain conditions of wind certainly exercise a marked tractive force on the air of the soil-pipe, but during periods of calm they all act as obstructions and lessen the natural flow. It is never important nor even desirable to establish a *strong* current through a soil-pipe; but it is of the utmost consequence that a constant movement be maintained, so that fresh air may always be furnished with sufficient frequency to renew the atmosphere of any part of the pipe before it shall have lost its oxidizing and diluting effect. It is most common in New York to finish the upper end of the soil-pipe by using what is called a "return bend," being a length of the pipe bent to a half-circle, so that it shall open downward. It is a common practice in Boston to cap the upper end of the pipe with a hollow hemisphere lifted a little above it. Both of these devices cause a decided retardation of the current, both increase the accumulation of frost in cold weather, and both are always and absolutely objectionable during a calm. Their chief good office is to prevent the introduction into the pipe, mischievously or otherwise, of substances which might obstruct it. The same protection will be afforded by a wire basket such as is used to keep leaves from being washed from eaves-troughs into rain-water leaders. As these baskets have some tendency to become clogged with snow they should be made of a mushroom or hemispherical shape, the space between the wires of the horizontal under portion being not less than three-fourths of an inch.



The branches built into the soil-pipe to receive the outlets of water-closets and other vessels should, where practical, be Y-branches or half-Y branches; though there is no serious objection to the use of T-branches on vertical pipes. The trap-screws and hand-holes provided to facilitate the removal of obstructions in soil-pipes are not necessary if the water-closets, sinks, etc., are of such a character as to deliver a strong cleansing flow at each use. With the flushing that is afforded by a good water-closet or by the flush-pot of a kitchen or pantry sink, anything that can enter it is sure to be carried through the pipe if a reasonable inclination is given to its horizontal runs. This ought not to be less in any case than about one in twenty-five, and it should always be as much as proper head-room in the cellar will allow. If the pipe can be carried along the straight wall of the cellar it had better start at the ceiling and leave the house near the floor.

In rare cases it becomes necessary to lay a drain for a considerable distance under the cellar floor. The usual directions given in such cases are that a channel of masonry covered with wood or stone shall be provided for its whole course. This arrangement furnishes an ideal harbor for vermin and is quite sure, if accessible at all, to become filled with dust, and so to become objectionable. When it is necessary to lay such a drain it should be made of heavy cast-iron soil-pipe properly coated and so thoroughly caulked that when its lower end is closed and it is filled with water with a head nearly to the height of one story of the house, it shall prove absolutely tight at every joint and in every part, water standing for at least ten hours without the least subsidence. Thus laid the drain may be trusted probably for all time, and it had better be solidly enclosed in strong cement-concrete with no crevice for the admission of even a cockroach.

A most important recent addition to the efficiency of the soil-pipe is a means for supplying ventilation at its foot, so that there shall be throughout its whole length a free communication with the atmosphere. With even a tolerably good sewer it is in my judgment best to admit the ventilating air at the foot by the omission of the usual trap separating the house-drain from the sewer. If the sewer is very foul, or if the delivery is into a cesspool, the trap should be used and inside of the trap there should be inserted a T-branch of the full diameter of the pipe, extended to the outer air and opening at some position not subject to obstruction by snow or litter. A good position for this fresh-air inlet in city houses is under the grating over the light-shaft of the cellar, or it may be carried to a sufficient height up the side wall of the house. In a country house it may be led to a little distance and turned up two or three feet above the surface, preferably in shrubbery. In any case this opening should be protected like the top of the pipe with a wire basket. To lead the fresh-air inlet to the edge of a sidewalk, to the surface of the area or to the ground-level, as is usually indicated in illustrations of the system, is open to the serious objection that in such positions it is at all times liable to be clogged with rubbish, and is quite sure to be closed by heavy snow.

The size of the soil-pipe is a matter of much importance, and it is one concerning which there is much diversity of opinion. I have never found it necessary, in the largest house with which I have had to do, to use a larger diameter than four inches, the capacity of a pipe of this size being far beyond the capacity of any number of fixtures liable to be used at the same time, even in a hotel, to fill it anything like half full. So far as the removal of wastes is concerned, a diameter of three inches would always be ample, and it is always to be borne in mind that the smaller the pipe the greater the flushing effect of a given stream passing through it, and therefore the less the deposit within it. Another consideration, however, is important. Under no ordinary circumstances, perhaps under no conditions that are likely to arise in practice, will the traps of the vessels connected with a four-inch pipe be disturbed by "siphonage" if the pipe is open at the top. The current through a three-inch pipe would be more likely to produce such a disturbance of its atmosphere as to cause siphonage. It seems warrantable, therefore, to adopt in this case a hard-and-fast rule and to say that the soil-pipe of any house where there are fixtures on the different floors should be four inches in diameter, unless the traps have "back ven-

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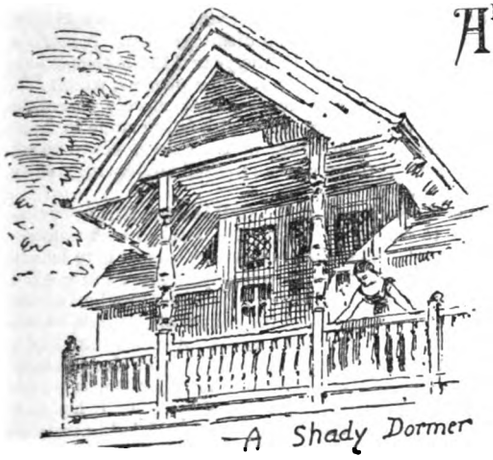
tilation," when three inches will suffice. I think that I have had sufficient observation of drainage works in a great variety of houses, and under a great variety of conditions, fully to justify this statement.

The vertical portion of the soil-pipe should be secured to the walls along which it passes in such a manner as to prevent any disturbance of its position and any vibration due to the sudden discharge of water-closets; but it should be strong enough in itself to maintain its integrity without such aid. Where the ground on which the house is built is of a firm and solid character, it will be sufficient to support the vertical pipe by a pillar of masonry or a post firmly planted on a solid footing. So, too, the horizontal run of the pipe in the cellar may be supported either by hooks secured to a wall along which it passes, or by piers or posts placed under it. If, on the other hand, the land is subject to subsidence, as it is for instance in the "made" lands of Boston, while such piers and posts may be used, they must not be entirely depended upon, and the pipe must be supported by strong hangers secured to the beams of the floor above.

OLD BOSTON BUILDINGS.[1]



ANOTHER Landmark gone." "A noted Relic of the Past removed." Hardly a week passes that we do not come upon a paragraph in some daily paper headed with some similar caption and each time that we see it a mild regret makes itself felt that we did not know of the existence of such a building and the destruction that impended, that we might have made at least an attempt to preserve some record of its architectural existence by inviting the aid of the nearest architect, draughtsman, or photographer — professional or amateur. These "relics of the past," these homes of our ancestors should not be allowed to pass away without leaving a record of themselves; not a mere photograph preserved in the family archives or an amateur's sketch, of such little interest that when in after years it comes to light it only excites our impatience because it only half tells its story and that half so imperfectly as to be unintelligible; but a more or less elaborate architectural drawing, measured where circumstances seem to require it and certainly detailed; for the character of a building depends vastly more on its detail than artist or amateur ever suspect. It is this absence of reliable detail which make the charming wood-cuts illustrating the various articles on our old homesteads that have appeared in *Scribner's* and *Harper's* during the past few years, of less practical value to the profession than even the rough outline sketch of an architect would have been; they are too impressionist; they elaborately conceal often the very things the architect most wishes to know, and when they do undertake to tell the tale they often tell it falsely.

It is a pity that a properly organized effort is not made to compile a record of these ancestral homes with their Spanish, Dutch, English, and French characteristics, and the varied history of their builders and subsequent inhabitants before fire, dry-rot, the reckless abuse of the proletarian classes into whose hands so many of them have fallen, and that feverish American passion for things new and novel — for the newest style, the latest improvement — sweep them away. Such an effort would be as deserving of support as the expedition to Assos, or the explorations among the pueblos, and would yield results immeasurably more interesting and of more living value.

Who will take it in hand and preserve the records of our architectural history before it is too late? We do have an architectural history, and one in which Americans may take a pride in spite of the scoffs of those of our countrymen who, having travelled abroad and seen the greater glories of the architecture of the eastern continent, are blinded to the less ambitious claims of our own structures.

The interest in the deeds of our forefathers excited by the Centennial Exhibition, and the craze for Queen Anne work stimulated many individuals and some societies to investigate these records of the past. Amongst others the Rhode Island Chapter of the American Institute of Architects in 1879 issued the prospectus of a species of competition, and offered prizes for the best set of drawings of the colonial work still remaining in the State of Rhode Island. We never heard that this effort had any result, and we fear that this department of the archives of the State is still represented only by empty portfolios.

Individuals, too, have attempted the task: Mr. Little did what he could to minimize the interest that centres about the old houses of eastern Massachusetts and New Hampshire, and Mr. Whitefield has wandered on foot here, there, and everywhere over New England making tame little lithographic sketches, often out of drawing but always interesting, of all the houses of the period that came in his way: modest cottages, decrepit farm-houses, and more stately mansions with their spacious and well distributed out-buildings are treated carefully with what skill he could command, and sincere thanks are due for the time and patience he has expended on what will be, whatever may be its own demerits, an invaluable guide-book for the fortunate possessors of more skilful and artistic hands. Mr. Tolman's is the latest as well as the best endeavor in this field, and every one who sees the neat portfolio of artistic sketches of some of the old buildings in Boston will hope that he will follow up the same line of work before the harvest, which is still fairly abundant, is reaped by the hands of time and the destroyer.

The buildings which form the subjects of these dozen sketches were selected after long search and comparison, because the internal evidence they offered seemed to prove their antiquity. Subsequent investigation has shown that not only was the selection a proper one on architectural grounds, but that many of the buildings have an historical importance or at least an anecdotal interest which a more thorough research into the traditions which still hang about them, despite the plebean uses to which they have sunk, would probably greatly enhance. But it is hardly to be expected that washer-women and the keepers and occupants of sailors' boarding-houses are posted on the histories of the buildings that now in a certain sense are desecrated by their presence, or that even the respectable owners — if there are such — are descendants of the original builders, or if they are not, have kept such record of their purchase that would enable a more experienced antiquarian than perhaps Mr. Tolman is to trace out their histories in all their interesting particulars. Still, if these sketches lack something of the glamour which would be thrown about them by a descriptive history which should give them all the benefit of local coloring, and the accessory interest of contemporary incident, they are interesting and valuable to layman and architect alike.

To have remained standing to this late day in a city so often swept by fire, and to have kept, in spite of the base uses to which they have of late years been put, so nearly what must have been their original condition, would seem to prove that they must be among the best of their class, the best built, the most sturdy, the homes of men who in those days could afford to pay for honest and substantial work; and the air of sobriety and reserve that hangs about such houses as are shown on plates II, V, VIII and IX, dimly suggest what must have been the home life in Boston in the days when streets were unpaved and grass-grown, and the tide-water washed where now are our busiest streets and most imposing warehouses; when the quiet of the seventh day differed but little from the mild bustle of the other six; when the apprentice felt that he had time to learn his trade thoroughly, and those who taught him appreciated the social dignity that a perfect mastery of their trade implied. Many of these houses were built slowly because they had to wait for the next ship to arrive from England with brick, perhaps, or nails, or fittings of one sort or another, and the mechanics had time, as well as understanding, to do their work thoroughly as those who labor in the feverish days of railroad and electric communication do not have; when bricks may be ordered and delivered within ten days to any part of the country, before the mortar has set in the joints of the last batch; when nails may be iron ore at the beginning of a week and be driven home into a balloon-frame at the end of it. It would be unwarrantable to prophesy that of the better class of wooden buildings built by the average mechanic now-a-days with average materials in the ordinary way not one would be in existence two hundred and twenty-odd years after its completion, but it would be proper to hazard the surmise that if an amount of money equal to that which would be necessary to keep such a building in good repair during this time, should be expended on the old Wells House on Salem Street, shown on plate III, the comparative depreciation of the two buildings structurally considered would be far greater in the first case than in the last.

One of the legends attaching to the Wells house is that during the persecution of the Baptists, one of the leading ministers was concealed in it; if, therefore, this legend is true, this must be the oldest building in Boston—older even than was the Dock Square building which was destroyed in 1860—for the persecution of Baptists was actively aggressive only between 1650 and 1680, and the house must have been built before or during this period, and the date commonly assigned to it by tradition, 1660, is probably the true one.

[1] Twelve Sketches of Old Boston Buildings. By George R. Tolman: 1882, Boston.

THE ILLUSTRATIONS.

COMPETITIVE DESIGNS FOR THE NEW PARLIAMENT HOUSES AT BERLIN.

WE reproduce from the *Deutsche Bauzeitung* perspective views of the two designs which received first prizes, one of the second-prize designs, and plans of many of the designs which received award in the late competition. The two first prizes were awarded to Paul Wallot, of Frankfort, and Friedrich Thiersch of Munich; the three second prizes fell to Kayser & von Grofzheim, of Berlin, Cremer & Wolffenstein, of Berlin, and Heinrich Seeling, of Berlin; three of the third prizes were assigned to Buese & Schwechten, of

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Berlin, Giesse & Weidner, of Dresden, and Ende & Böckmann, of Berlin. The ground plans only are shown, and as their general scheme is sufficiently plain even to those who cannot understand the German abbreviations used, we have not attempted to re-letter the plans. One thing only we will draw attention to, the *ja* and *nein* doors on either side of the hall which some of the designers have provided to facilitate the taking of a vote when a division is found to be necessary.

THE ELWOOD MEMORIAL BUILDING, ROCHESTER, N. Y. MR. JAMES G. CUTLER, ARCHITECT, ROCHESTER, N. Y.

AS TO THE DURABILITY OF BUILDING-STONES.

BEING fully aware of the general attention that has in all times been directed to the durability of stone, we yet question whether the subject has been anywhere exhaustively treated, either in England or on the Continent. Although holding closely to the need of experience, we yet should not forget that both chemical analysis and other methods of scientific investigation have made great strides of late, and that it may become essential to the architect to inquire how far they may throw light on the question of durability. We may practically know the difference in the durability of Bramley Fall and Portland stone, but if we know not only the fact, but its causes we have made a step in advance. This consideration will have more weight from some observations to which we shall have to refer as to the durability of granite.

For a contribution of much value to this investigation we are indebted to the Director-General of the Geological Surveys of the United Kingdom, Dr. Archibald Geikie, F. R. S. It is from the note-books of geological rambles, and as regarded from the stand-point of geologists, that the observations to which we have to refer have been extracted. None the less, it strikes us, do they form a very valuable beginning. Our own experience, and we do not doubt that of many a reader, is enough at once to contribute some examples to those which have been elaborately investigated by Dr. Geikie; and we look forward with confidence to the preparation, sooner or later, of a comprehensive scientific work on the durability of building materials, in which chemical and lithological science shall have their due parts, side by side with the verdict of experience.

Dr. Geikie's researches have, in the first instance, been directed to the older burial grounds in Edinburgh; the reason, of course, being, that as tombstones are usually date-bearing monuments, the means of comparing the progress of decay and the lapse of time are unusually precise. To these humble slabs we take leave to add, especially for the benefit of architectural travellers on the Continent, the category of scutcheons and armorial bearings. Many ancient buildings, especially in Italy, are adorned with stone armorial bearings. Of these the herald will be in many cases able to indicate the date with considerable accuracy. And, speaking now only from memory, we should say that a study of lithological degradation in Italy, based on dated works of this kind, will give results so widely different from those obtained by Dr. Geikie in Edinburgh as to point to the primary canon,—that the first division of any study of the subject must be topographical, or, rather, climatological.

Dr. Geikie points out that the effect of weather in a town is likely to be in some measure different from that which is normal in nature. The disengagement of sulphuric acid from the reek and smoke of chimneys is one of the causes of the more rapid decay of stone-work in urban, as compared with rural, localities. On the other hand, the range of temperature is likely to be less active in a town. And the incrustation of the surface of the stone with dust, smoke, and other inorganic as well as organic matter, in town buildings, has to be borne in mind, although there may be a question as to the action of such incrustation on the interior substance of the stone.

Around Edinburgh the materials used are of three kinds,—1st, calcareous, including marbles and limestones; 2d, sandstones and flagstones; 3d, granites.

With few exceptions, the calcareous limestones in the Edinburgh church-yards are constructed of ordinary white saccharoid Italian marble. There may also be observed a pink Italian shell marble, and a finely fossiliferous limestone, containing *foraminifera* and fragments of shells.

The marble occasionally is employed as a monolith, in the shape of an urn, vase, or the like; but it has been usually fixed in a frame-work of sandstone. And it is as to its behavior in the latter case that the observations we have to mention will prove to be novel to most of our readers. Dr. Geikie has, in the first instance, subjected specimens of the marble, both when freshly cut and when long exposed to the weather, to microscopic examination. His view of the process of degradation is that it is of a threefold character. The process of weathering, he says, in the case of this white marble, presents three phases, sometimes to be observed on the same slab, viz., — superficial solution, internal disintegration, and curvature with fracture.

With superficial solution we are tolerably familiar. It becomes apparent in the gradual dimness that comes over the polished surface of the marble. This is effected by erosion, partly by the carbonic acid, and partly by the sulphuric acid contained in the atmosphere, and notably in the rain that falls in towns. The rapidity of the process in Edinburgh depends very much upon aspect and exposure to rain. Exposure for not more than a year or two to the prevalent westerly rains is enough to remove the external polish, and to give the surface a rough character. The granules of pure calcite, which have been cut across or bruised in the cutting and polishing process, are first loosened or dissolved, and then drop out of the stone. An obelisk erected in 1864, in Grey Friars' church-yard, is cited as an example in which the surface has already become so rough and granular that it might be taken for sandstone. The grains are so loosened that a slight movement of the finger will rub them off. The internal structure of the marble begins to reveal itself. The harder knots and nuclei of calcite project above the surrounding surface, and irregular channels, from which the lime has been carried away in solution by the rain, resemble the bleached and furrowed aspect of the rocks on the side of a mountain.

Solution, or decay of some kind, seems rather to be hidden than prevented by the formation of a surface-crust. This Dr. Geikie considers to form most rapidly where solution is most feeble in its apparent action. Beneath it the stone turns to a loose crumbling sand. In time the crust cracks into a polygonal network, and rises in blisters, exposing the under material to rapid disintegration. A marble urn erected in the same church-yard in the year 1792 is thus crumbling into sand, although it faces the east. The process, which Dr. Geikie describes with elaborate minuteness, must closely resemble that which may be observed to take place with oolite stone in London: as, for example, on the south face of St. Paul's, where thick cakes of a black color may at times be seen to shell off, leaving partly disintegrated stone exposed to view.

It is the third form of decay, which Dr. Geikie describes as curvature and fracture, as to which, we think, the observations now recorded are the most novel. The most remarkable phase is to be observed in slabs of marble which have been firmly inserted into a solid frame-work of sandstone, and placed either in an erect or a horizontal position. It appears as a swelling-up of the centre of the slab, which forms, as it were, a blister that finally ruptures. A case is cited of a slab 22″ x 30″, and ¾″ thick, built into the south wall of Grey Friars' churchyard. The date of the last inscription on it is 1838, at which time it is presumed that the slab was smooth and upright. It has now escaped from its fastenings on either side, though still held firmly at top and bottom, and projects from the work like a well-filled sail, to the distance of 2½ inches. A series of rents, one of which is one-tenth of an inch in width, has appeared along the crest of the fold. In another case, that of a tomb erected in 1799, facing south, and protected by overhanging masonry from the weather, the inscription has become partly illegible, the stone has bulged out in the centre, and cracks begin to riddle the blister. On another slab, twenty years older, dated in 1779, on the west wall, the process of destruction has advanced to a further stage, and, since it was sketched by the author of these notes, has altogether fallen out and disappeared.

It is the opinion of Dr. Geikie that this mode of destruction is due to the action of frost. As to this we are disposed fully to agree with him, and that from observations of our own which bear on the subject. One set of these regard the durability of marble where frost is unknown, or rare. For example, we can cite a large marble tablet built into the wall by the eastern gate of the little archiepiscopal city of Sorrento, which contains (or did some years ago) a long and perfectly legible Latin inscription, of the date of the Spanish rule in Naples. Again, on the gates of the City of Naples, and on the Castle Nuovo in that city, are scutcheons of arms which have been defaced on some occasion of change of dynasty, and on which the marks of the chisel are so fresh that it is clear that the absence of armorial bearings is not due to the lapse of time, but to political causes and purposed violence. In these instances, to which a very moderate acquaintance of Southern Europe can no doubt add many more, we have ample proof of the monumental durability of marble, although freely exposed, in a climate where frost is very rare, and never of sufficient intensity to get good hold of the surface of the ground. The other observations refer to the curious permeability of limestone to wet. It may be said, perhaps, that the water which collects on the interior surface of a limestone or marble wall does not percolate, but is condensed by the cold of the wall from the atmosphere. Weeping through solid stone seems, indeed, incredible; but we can cite one instance of a wall made of mountain limestone, thoroughly well built, and 3 feet thick, in H. M. Dockyard, Pembroke. It is the wall of a smithy. When it was newly built, when the rain drifted on it from the west the wet ran down within the buildings as if the walls had been of chalk, or some porous substance. We do not assert that the wet did come through the walls; but it appeared so to do. And, at all events, this and other experiences point to a hygrometric condition in the purest and densest limestones which is likely to have a very destructive effect in the event of the occurrence of frost directly after rain.

Dr. Geikie comes to the conclusion that the lowering of the surface of marble by superficial solution may amount to ⅛″ in a century: a reduction to a pulverulent condition in about forty years; and a total disruption by curvature and fracture in a century. We only add the condition that this must be where frost is energetic in its action.

The endurance of sandstones and flagstones is a question of selection. In those which consist almost wholly of silica, the durability

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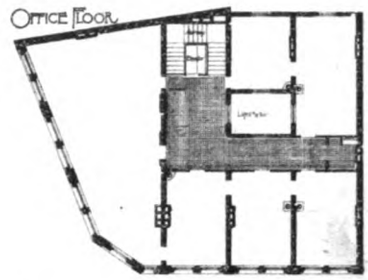
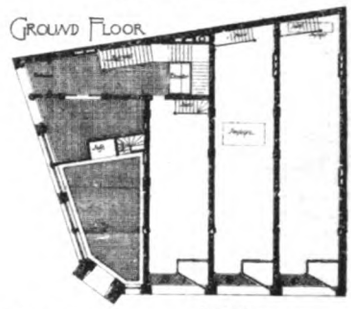
The "Elwood Memorial Building" Rochester N.Y.

Jas. G. Cutler Architect





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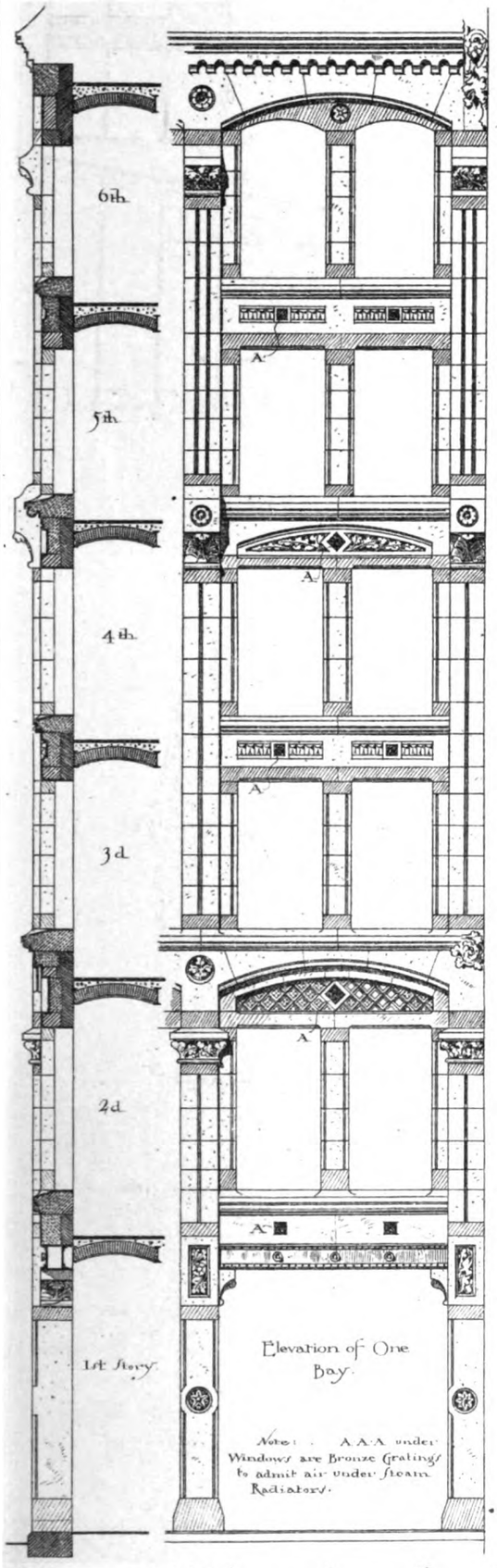

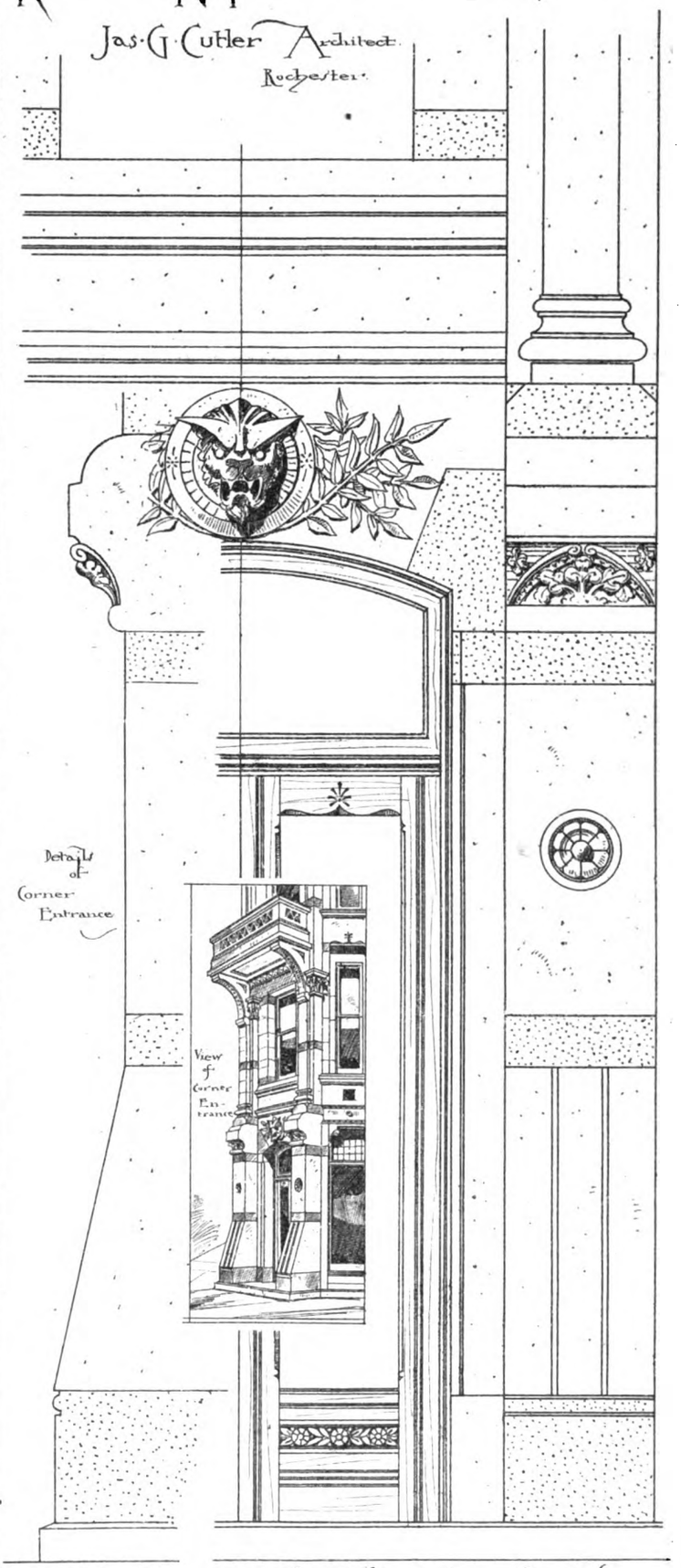

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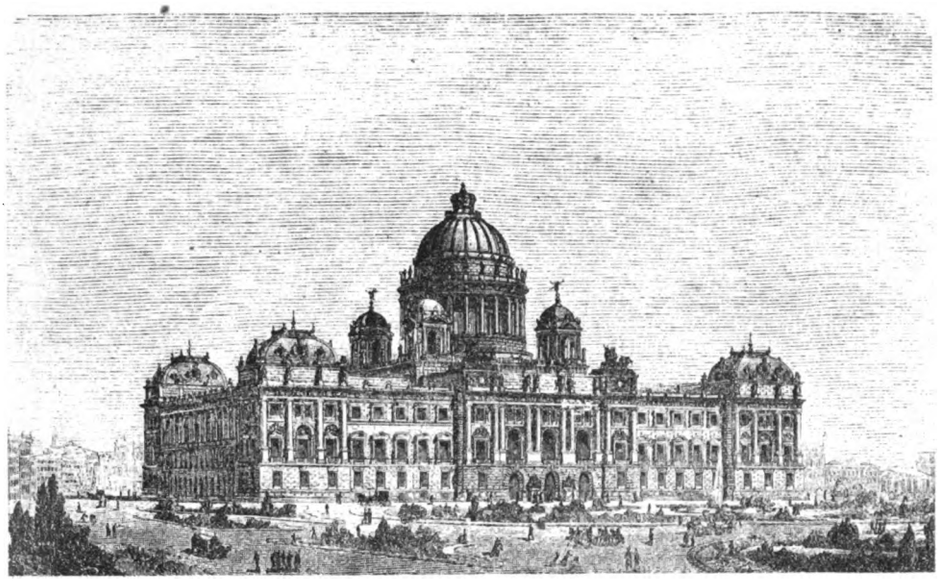

Entwurf von Friedrich Thiersch in München. Ereter Preis.

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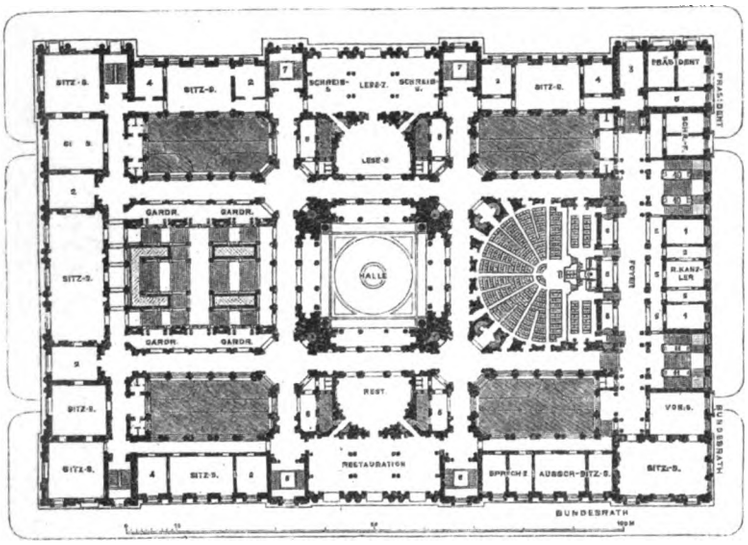

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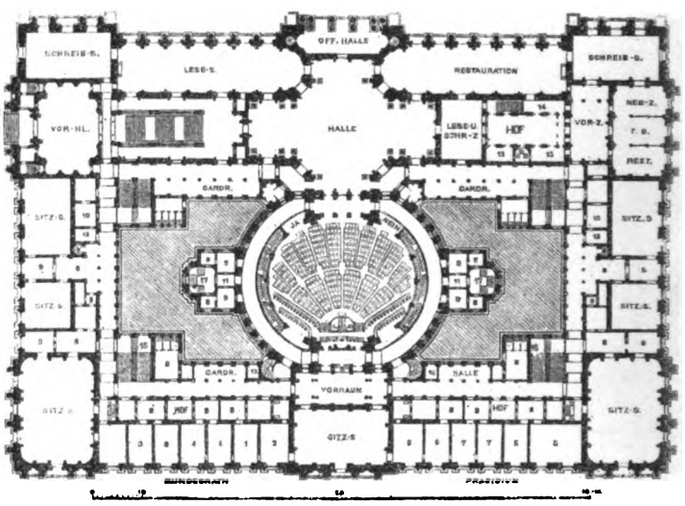

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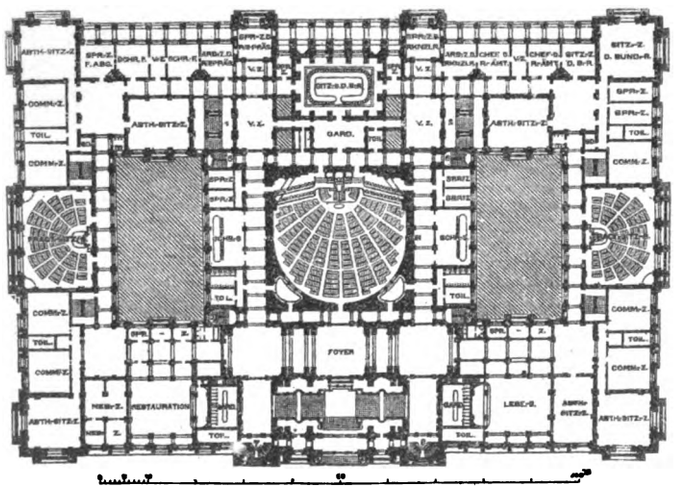

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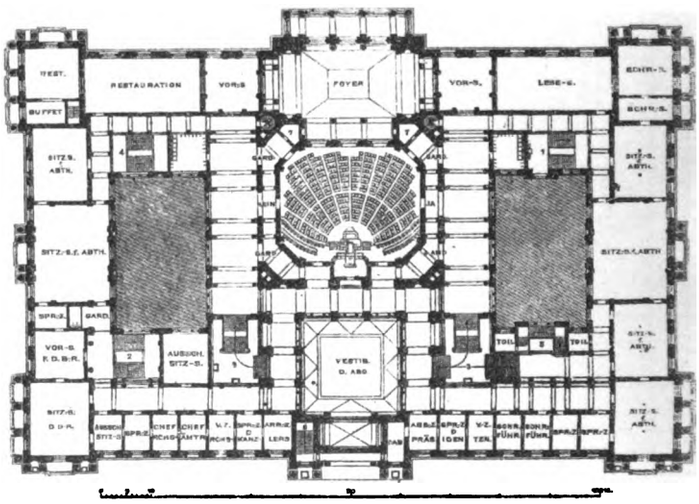

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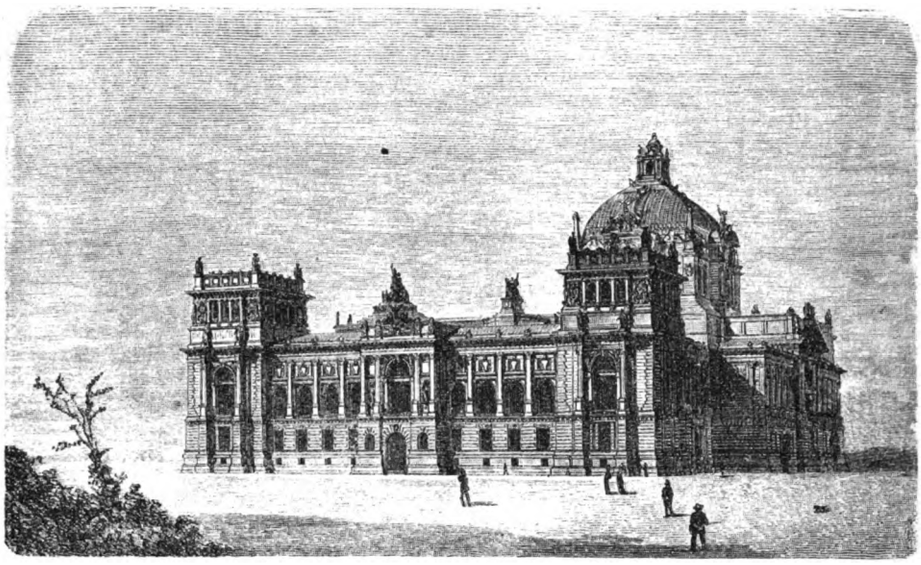

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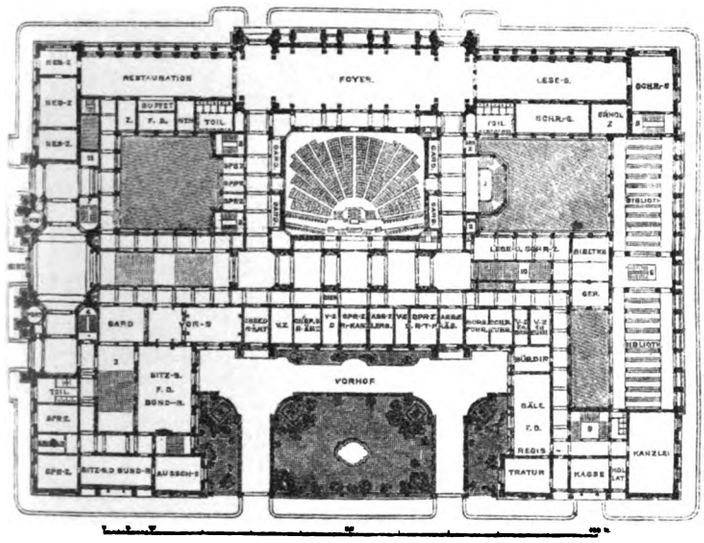

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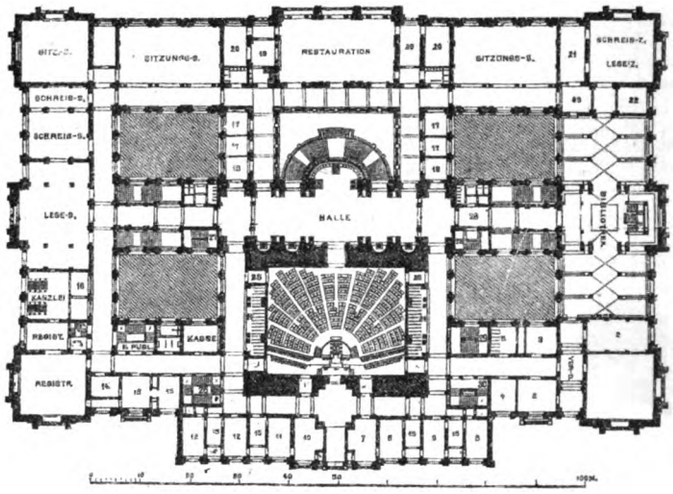

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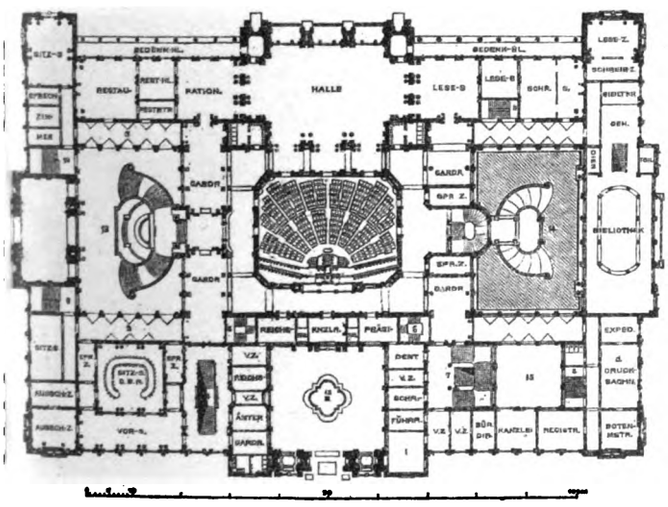

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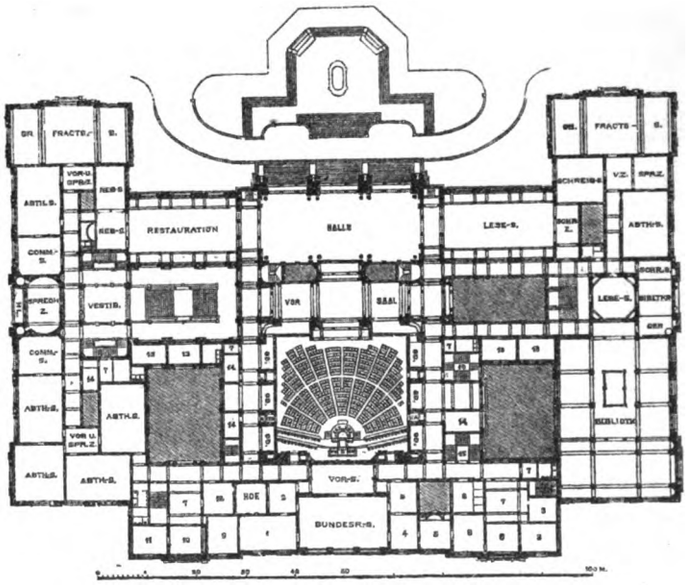

Entwurf von Cremer & Wolffenstein in Berlin. Zweiter Preis

BERLIN HOUSES OF PARLIAMENT.

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is very great. Some of these stones contain as much as 98 per cent of silica. A tomb of this material is cited which was erected in 1646, and ordered by the Scottish Parliament to be defaced in 1662. The original chisel-marks are still fresh on the surface of the stone (as in the case of the scutcheons at Naples), on which the lapse of two hundred years has produced little effect, except that of somewhat roughening the exposed faces on the west and north sides.

In cases, however, of striated or colored sandstones, destruction goes on by solution of the cement or matrix in which the particles of silica are embedded. The most common kinds of matrix are clay, carbonates of lime and of iron, and the hydrous and anhydrous peroxides of iron. In one case of a stone of this kind an inscription cut in 1863 is no longer legible. We should like to know the depth to which the letters were originally cut: $\frac{1}{8}$″ at least has been removed from the stone in sixteen years, which is at the rate of nearly $\frac{3}{4}$″ in a century.

The well-known propriety of the rule for setting stone on its natural bed is illustrated by the degradation of laminated flagstones when set on edge. Dr. Geikie cites an instance in the case of stones thus treated of the loss of $\frac{1}{8}$″ in thickness in forty years, which rather exceeds $\frac{3}{4}$″ in a century. A curious instance is also given of pillars of a concretionary sandstone, which exposure to the air for one hundred and fifty years has hollowed out into positive troughs, with hollows from 4″ to 6″ deep, and from 6″ to 8″ broad.

As to granite, we are referred to the experiments of Professor Pfaff, of Erlingen, described in the *Allgemeine Geologie als exacte Wissenschaft*, p. 317, on granite, syenite, Solenhofen limestone and bone. From the limestone the Professor found the loss to amount to the removal of a uniform layer of 0.04 millimetre in three years, which gives .52″ in a century. The annual loss of granite he estimated as 0.0076 millimetre per year from unpolished, and 0.0085 millimetre per year from polished surface. This difference of more than 10 per cent against the latter is contrary to what would have been expected, and it has to be asked for what period of time the more rapid weathering is supposed to continue. The slower rate amounts to .30″ per century. Granite has been employed monumentally in Edinburgh for too short a time to allow of the measurement of its rate of decay there; but in connection with the subject we may be allowed to recall remarks made in the columns of the *Builder* nearly twenty years ago on the subject of the rough and granulated surface of the granite on the west face of Waterloo Bridge. The arches and exterior face of that bridge are built of Cornish granite, from the vicinity of Penryn, and the balustrade is made of fine gray Aberdeen granite. A careful and exact admeasurement of the projections of this bridge, compared with the original dimensions, would enable the student to arrive at a correct estimate of the rate of weathering of these two kinds of granite in London. The bridge was opened in June, 1817.

The close of this interesting specimen of the "Geological Sketches" of Dr. Geikie refers to the fact that in the towns and villages in the northeast of Scotland, where the population is sparse, and where comparatively little smoke passes into the air, the marble tablets last longer than they do in Edinburgh, but still show everywhere indications of decay. They suffer chiefly from superficial erosion, but cases may be observed of curvature and fracture.

In contrast to the perishable character here ascribed to granite, to marble, and to any but the purest silicious sandstone, is the durability of the humble material, clay slate. This is employed for monumental purposes in Aberdeenshire. It contains cubes of pyrites, which might have been anticipated to prove sources of destructive chemical action, but which seem to be inert. The stone is easily dressed in thin smooth slabs. A tombstone of this material erected in the old burying-ground at Peterhead, between 1785 and 1790, retains its lettering as sharp and smooth as if only recently incised. The stone is soft enough to be easily cut with a knife. The cubes of pyrites are covered with a thin film of brown hydrous peroxide. The slate is slightly stained yellow round each cube, but its general smooth surface is not affected. While neighboring marble tablets, one hundred to one hundred and fifty years old, present rough granular surfaces and half-effaced inscriptions, the lapse of nearly a century has produced scarcely any appreciable change upon the clay slate.

The durability of this material, when prepared by nature for the stone-cutter, may be compared with that of the even humbler, but equally durable, substance of artificially baked clay. In the dry and frostless air of Egypt, marble and granite are almost perennial in their duration. But the main revelation of the forgotten history of the past is derived from the baked clay inscriptions of Assyria. The inertness of this substance, its hygrometric resistance, and feeble chemical affinity with any element with which it comes in contact, is the cause of its indifference to the passage of time, or rathe to the recurrence of those changes of temperature and of moistur which accompany the revolution of the year. If the value of clay slate as a material for monumental inscriptions had been better and more largely known, how much would our churches and church-yards tell, which is now wholly unrecorded?

The chief cause of the interest which we took, from the first hint of this publication, that reached us by chance, in these researches of Dr. Geikie was the hope that they would throw some definite light on what we regard as the most difficult and one of the most interesting questions relating to any monuments in Europe, viz.: the age of Avebury and of Stonehenge. Nor are the remarks without direct bearing on that subject. The stone known as "Sarsen" fulfills the requirements above shown to be conducive to the most permanent durability. It is compact, uniform, close-grained silex. We cannot cite any chemical analysis of the stone; but we do know that the Wiltshire farmers have found it so indestructible by the usual instruments of agricultural violence, that they had recourse to the barbarous plan of roasting these priceless monoliths, heaping faggots on them to make a bonfire, and then throwing on cold water to crack the stones! This argues wonderful resisting power in the "Sarsen," and no one can be familiar with the stone in question without seeing that it affords the least possible advantage to the tooth of Time. Time, indeed, as Dr. Geikie observes, is not an agent, except indirectly, in the matter. Mere duration from day to day has little or nothing in it that is destructive, as we see in Egypt. It is because the revolution of the year and the succession of the seasons expose a monument to the successive and ever-repeated attacks of rain, of frost, of perhaps the scoring draughts of wind-driven sand, and because the incessant repetition of these small causes of decay produces a great accumulated effect, that we regard time as destructive. But too much attention cannot be given to the consideration that it is the action of severe frost on stone containing water that is the main cause of decay, and we venture to suggest, as a subject for careful chemical analysis, how far the existence of water or the elements of water, not as moisture but as chemically combined with lime, magnesia, or other elements, in a stone, may render it susceptible to the attacks of frost. That idea is perhaps a new one; but we feel certain that the hygrometric relations of marble and compact limestones are not by any means clearly understood. The effect of frost on these stones has been shown. This view of the case makes it the more necessary to repeat and to comprehend the experiments of Professor Pfaff on granite. In anticipation any one would have said that polished granite would be the most durable; and the idea that it would most thoroughly throw off the rain and thus escape soaking and subsequent frost-splitting concurs with this anticipation. If the case really proves to be the reverse we can see no explanation for it, except in the possibility of the bruising of individual molecules of felspar in the process of polishing, so as to make them more readily absorbent. But this is a subject that will repay the most careful experiment.

As to the Wiltshire monoliths, we think that the whole inquiry above mentioned points in the direction of their immense antiquity. The only chance, so to speak, of Time for attacking them is when they are so set as to expose the ends of what really is, though not visibly, the bed-course. Those who know Avebury will remember the marks of decay on some of the 18-foot monoliths that form the sides and roofs of the cellæ. The inference, seen from the light of the Edinburgh observations, points to enormous age. Let us add that, at a distance from the spot, we have no means of determining the chemical constitution of the "blue stones" in the inner ring of Stonehenge, or their present condition as compared to that of their giant brethren in the trilithons. Here is a subject for careful observation, analysis and record, and it may prove that a comparison of the chemical constitution and lithological condition of these two kinds of stone may enable the man of science to construct something of an archæological calculus that will throw light on the date of Stonehenge. — *The Builder.*

CYPRESS.

KNOWING that what we said last week about the attempt now making to introduce cypress as a building wood to the relief of our lessening supply of pine would make our readers desire to know as much of it and its characteristics as possible, we reproduce from the *Northwestern Lumberman* the following account:

The cypress tree (*Cupressus disticha*) is one of the most interesting of its genus for the varied application of its wood, and also for its extraordinary dimensions in a favorable soil and climate. In Louisiana it is called cypre or cypres, and in the older southern states cypress and sometimes bald cypress. The names of black and white cypress in the Carolinas and Georgia are founded entirely on the quality and color of the wood. It is not found above the latitude of 39°. About the first appearance on the eastern coast is on the banks of Indian River, in Delaware, and farther southward it becomes more abundant in the swamps. In Maryland and Virginia it is confined to the vicinity of the sea, where the winters are mild and the summers' heat intense. Beyond Norfolk its limits coincide exactly with those of the pine barrens,

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and in the Carolinas and Georgia it covers a great portion of the large swamps bordering upon the rivers after they have left the mountains. The great Dismal Swamp of Virginia and North Carolina extends from near Norfolk a distance of about forty miles, with an average width of twenty-five miles, and this abounds in cypress, plentifully interspersed with white cedar. Since the war the primitive methods of lumbering have been abandoned, and now there is a canal running north and south through the swamp, which is used for transporting logs to Norfolk. In some places the old corduroy road has given way to tramroads, and the mule carts have disappeared.

The Mississippi River, from the delta to the mouth of the Arkansas River, is bored with marshes, which, at each annual overflowing, forms a vast expanse of water. In Louisiana those parts of the marshes, where the cypress grows almost alone, are called cyprieres, or swamps, and sometimes there are thousands of trees in a tract. In these swamps of the sunny southern states, from Florida to Texas, where, on the deep, miry soil, a rich layer of vegetable mold is every year deposited by the floods, the cypress attains its greatest development. The largest trees are 120 feet in height, and from 25 to 40 feet in circumference above the conical base, which at the surface of the earth is always three or four times as large as the continued diameter of the trunk. Those felling the trees build scaffolds five or six feet high, upon which they stand to chop down these huge southern vegetable monsters. The base is usually hollow for three-fourths of its bulk. Its surface is longitudinally furrowed with deep channels, the ridges of which serve as cramps to fix it more firmly in the loose soil. Upon the largest roots are conical protuberances 18 to 24 inches long, and sometimes four to five feet thick. These are hollow, and the surface is covered with a reddish bark, like the roots, which they resemble. These curious growths exhibit no signs of vegetation, and no cause can be assigned for their existence. They are peculiar to this tree, and begin to appear when the tree attains an altitude of 20 or 25 feet. They are not without value, as they are used for bee-hives — the famous bee-gum of the Americanized Ethiopian. Amidst the pine forests and savannas of Florida is seen, here and there, a bog or a plash of water filled with cypress trees, the squalid appearance, even when they exceed 18 or 20 feet in height, showing how much they are affected by the barrenness of a soil which lacks a layer of vegetable mold.

The wood is fine grained. After exposure to the air it becomes of a dim reddish color. It possesses great strength and elasticity, and is lighter and less resinous than the wood of the pines. To these properties is added the faculty of long resistance to the heat and moisture of a southern climate. The color of the bark and properties of the wood vary with the nature of the soil. Trees growing near the natural bed of rivers, and surrounded half the year with water to the height of three or four feet, have a lighter colored bark than those standing where water does not reach them, and the wood is whiter, less resinous, and lighter. These are called white cypress. The others are darker, and so called black cypress.

In the preparation of the wood both varieties should be cut in winter, and seasoned until perfectly dry. Where the wood abounds it is extensively used for building purposes. Roofs covered with cypress shingles from timber cut in winter will last for forty years. The boards are preferred to pine for the inside work of brick houses in the South, and for window-sashes and panels of doors exposed to the weather. Cabinet-makers in the South use it for the inside of mahogany furniture. It has been used for the sides of vessels, and to a limited extent for masts. Large trunks are frequently made into canoes, some of them thirty feet long and five feet wide. They are more solid and durable than those of any other tree. It makes the best pipes to convey water under ground, especially the black variety. There is some difficulty in the manufacture of the lumber. Many trees are quite defective, hollow and shaky. The green wood is very heavy, and will not float. They are sometimes girdled one year before felling in the swamp, to get them free from the sappy fluid, after which they can be rafted.

This truly excellent wood is now used for various purposes, and there is an increasing inquiry for it. Boat-builders use it to a considerable extent. Many of the small boats belonging to the men-of-war in the United States service are constructed of cypress; much is used for water-tanks on account of its durability; some enters into the construction of houses and house-finishing, it being excellent in ceiling, and large quantities are made into shingles and railroad cross-ties. The Lehigh Valley Railroad Company ordered 75,000 of these ties to be used upon its road this season. In some instances the shingles are manufactured with the large end finished round and octagonal, that the roof may present a finer appearance. These kinds are used upon churches in the rural districts, and upon villas where the builders wish to display some taste in lines that vary from the ancient, straight and conventional methods. Some claim that shingles, properly prepared, will last one hundred years. They are certainly very durable. Wood taken from submerged swamps, which has been in contact with the decaying influences of mud and water for untold centuries, is found to be in an excellent state of preservation. Cypress logs have been taken from the soil deep underneath New Orleans in good condition. Evidences are abundant and conclusive in regard to the lasting properties of the wood. Hence it is gradually creeping into use more and more each year. Already it is being used in many houses in New York city in finishing, with calls for more. Five million shingles is the estimated amount of consumption in the New York market, with an increasing demand. The most of these are manufactured in North Carolina and Virginia. At least 3,000,000 feet of wood will be required to supply the market in railroad ties the present year, and about 2,000,000 feet of lumber for general use. It is exported to some extent to various ports. Railroad ties have been sent to Cuba, France, and England. Lumber has been sent abroad, but in no great quantities.

ON THE PREVENTION OF FIRES IN THEATRES.[1]

MR. C. JOHN HAXAMER recently read a paper on this subject before the Franklin Institute which has been published in the *Journal* of that society and from which we make the following excerpts:

First, as to the number of theatres in general: Europe contains 1486 theatres, of which France has 337; Italy, 296; Spain, 178; Great Britain, 164, and Austria, 152. The United States have 567 (about). Paris has 40; London, 32; New York, 21; Naples and Milan, 31 each. Philadelphia, 12, and Rome, Turin, and Brussels, each 10.[2]

Comparing the number of theatres with the population we find the following ratios:

Italy, one theatre for every 75,000 inhabitants. United States one theatre for every 90,000 inhabitants.

Spain,	one theatre for every				93,000	inhabitants.
France,	"	"	"	"	110,000	"
Great Britain,	"	"	"	"	184,000	"
Austria,	"	"	"	"	235,000	"
Russia,	"	"	"	"	1360,000	"
Turkey	"	"	"	"	2,000,000	"

Theatre-fires can have but two eventualities; either the fire is extinguished in a few minutes, or the entire theatre destroyed. This is easily accounted for by the extraordinary danger, from fire, of our modern theatres.

In the large space called the stage (of which the audience sees comparatively little) we find immense masses of laths, boards, and other wood-work, which, by long heating, are entirely dry, and may, therefore, be instantly inflamed. Among these we find great quantities of gauze, coarse canvas, and other easily inflammable goods. Furthermore, ropes, paper soaked in varnish, paste-board, etc., in short, a mass as readily inflammable as could well be found.

In the midst of these is the more or less well-arranged heating apparatus; also a great number of gas-flames, each forming a dangerous sphere around itself.

The danger is still increased by these combustible materials not remaining stationary. They are let down, drawn up, shifted about, and are, therefore, more liable to come in contact with the gas-flame. At times it is necessary to provide illuminating effects temporarily, as, for instance, where the chandelier of a ball-room scene which is fed by a rubber hose, must be removed during a change of scene.

We are particularly careful in places filled with combustible materials to enter them with closed lanterns only, eschewing open lights and candles. On the stage, to the contrary, guns are fired off, torches swung, fire-works set off, while, at the same time, scenes of laths and canvas are let down, as, for example, in the last scene of "Sardanapalus." A German writer on this subject says: "One who has been behind the scenes during the performance of a spectacular piece, and found himself suddenly enveloped in a sea of fire, and has noticed how a score of men are engaged in extinguishing (by means of wet rags suspended on long poles) the sparks which have settled on the scenery; who has noticed how, notwithstanding all care, fiery objects fly from their prescribed course, or has seen how a piece of fire-work too strongly loaded throws everything into confusion; one who sees this for the first time cannot overcome the feelings of astonishment and fear; and this, when viewed from the audience, is no more than is common in spectacular pieces."

These circumstances, not taking into account criminal negligence, show how readily a stage may be set on fire; and how if not extinguished immediately, or at most in the first minute, it must spread with immense rapidity and destroy the whole building. After this time the most strenuous efforts are futile. During such intense heat the, so-called, fire-proof constructions become useless, the strongest walls are destroyed, marble is burned into lime, cast-iron disintegrates, wrought-iron loses all tenacity, and the entire building is destroyed. . . .

The time of day at which such fires occur is a consideration of great importance. It has been calculated that 13 per cent of all the thea-

[1] [A paper read at the Stated Meeting of the Franklin Institute, held June 21, 1882, by C. John Hexamer.]

[2] The above statistics were taken several years ago. An article in the *Daily News* a short time ago, shows that London, at present, has 57 theatres, 408 music halls and 475 other places of amusement, which can, on the average, accommodate daily 3 2,000 persons. The average daily attendance at the theatres is about 136,000.

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tre-fires occur in day-time, before, or during rehearsals, which are generally held by gas-light; two per cent in the evening before the audience has entered; 21 per cent during the performances; 48 per cent during the two hours following the performances; and 16 per cent later at night. The statement may excite surprise that nearly one-half of all theatre-fires occur two hours after the performances; and that it is this period which is the most dangerous. It has been stated above that, in theatres, flames spread with lightning speed, but in case a spark has settled on a piece of canvas, it may glow for a long time unnoticed, until a sudden draught causes it to burst into flames. This cause combined with the poor, or entirely neglected, watching of stages at night-time explains this seemingly peculiar fact. . . .

Of all the better known theatre-fires, it has been found that 23 per cent were isolated, and on this account the further spreading of the flames was impossible; 36 per cent greatly endangered the surrounding buildings, and these were only saved by the most strenuous efforts, and 41 per cent (nearly half) extended to other buildings. Theatres should, therefore, not expose other buildings. . . .

The most frequent cause of fire is carelessness. An instructive example is afforded by the destruction by fire of the "Grand Opera House" at Dresden. With incredible carelessness workmen had been ordered to repair some rubber hose with a benzine solution; the garret in which they worked being dark, they lighted it by candles. These inexperienced people carried on this dangerous business for some time, until at last, on the 21st of September, 1869, one of the workmen, in lighting a candle, lit the benzine on his hands, and at the same time some rags: in a short time the whole building was in flames, and totally destroyed. With such management it may not excite surprise to learn that during the fire all water reservoirs were empty, and that the wire curtain was rusted fast, and could not be let down.

The question is frequently asked, "What can be done to diminish the combustibility of materials employed on stages?"

This is not an easy question to answer; that the heating and lighting appliances, divided over manifold points of the stage, as well as manipulations with open lights, and even fire-works, are necessary for modern theatrical performances, there is no doubt. In themselves they are not dangerous; but the danger lies in the great quantity of wood-work, gauze, coarse canvas, and other readily combustible materials of which scenery is made. If we remove the ready combustibility of these objects, not every spark and flickering gas-flame will endanger the existence of the entire theatre, and the special danger of the stage and loft-rigging is immediately overcome.

The experiment of making certain pieces of decoration of an incombustible material has been tried many times, and with considerable success. Especially the flies, as being most exposed and hanging among the border-lights, have in some cases been made of fine wire gauze. The interstices were then filled with an incombustible substance, and the flies were then painted in the usual manner. This method certainly gives entire security against fire, and the greater amount of first cost is more than counterbalanced by their greater durability; but the inconvenience of handling such pieces is greatly increased by their greater weight, making them practically impossible for drops, and larger wings and flats.

Another device is to protect the wood and canvas by painting it with suitable materials, and thus to make it incombustible.

After the rebuilding of the "Opera House" at Munich (destroyed by fire, 1823) the wood-work was given a few coats of water-glass. This kept well for twenty years, but later trials showed that the coating of water-glass had changed its *chemical composition, and gave no further security.*

Water-glass is further objectionable on account of the gloss it imparts to scenery, thereby reflecting light, and spoiling the artistic effect of the painting.

The impregnation of scenery, before painting, has been strongly advocated, and especially of the afore-mentioned flies. Some of the different substances used for this purpose are alum, sodium sulphate, borax, the soluble fluorides, and calcium sulphate. It was claimed that by impregnation canvas became so far incombustible that it could neither propagate flames, nor glow for any length of time, and even under great heat would only char.

After the fire at the "Berlin Opera House" the authorities ordered the soaking of all scenery in a solution of alum.

The same question was raised, and given a commission to decide, some twenty-five years ago, in Paris. On account of the report of this commission an ordinance was issued enforcing the impregnation of all scenery. This was carried into effect in several theatres until, unexpectedly, some impregnated gauze was set on fire by the heat of a candle. The mayor had the case investigated. It was found that the ingredients used had lost their protective power, and had changed the chemical composition of the paint.

The writer ascribes the failure of these experiments to the manner in which the process was conducted: the canvas being in all cases, merely soaked in the solution, and then dried and painted. If a piece of canvas is soaked in water-glass, and allowed to dry, the liquid, in losing its water, will contract more and more, until finally the solid particles will sit loosely on the *yarn* of the canvas.

Again, sodium tetra-silicate (water-glass being soluble in water) is dissolved on coming in contact with water. The water-colors used in scene-painting may, therefore, have dissolved the greater part of the silicate at the start.

To obviate this the author would suggest the following: After thoroughly soaking the canvas in water-glass it should be placed in a dilute solution of hydrochloric acid: this would precipitate the silica inside of the *fibres* of the yarn itself. The reaction being the formation of silica, sodium chloride, and water; viz.: $Na_2Si_4O_9 + HCl = 4SiO_2 + 2NaCl + H_2O$. The silica, being insoluble in water, could not be washed out, and, on account of its precipitation in the fibres, could not readily be thrown out, this process being a parallel case to the use of a mordant in dyeing; the linen in that case being first soaked in color, and this then precipitated (made fast) by the mordant. As silica has no gloss this process would also get over that difficulty.

Of course, any other incombustible substance precipitated into the fibres will answer as well as the above.

Other solutions recently recommended for purposes of impregnation are: Versmann's and Oppenheim's, who advise a solution of 2 parts of sodium tungstate with 3 parts of sodium phosphate; Nicoll, one consisting of 6 parts of alum, 2 parts borax, and one part dextrine dissolved in soap-water; Siebdrath uses 5 parts of alum, 5 of ammonium phosphate, and 100 parts of water; Patera, 15 parts borax, 11¼ parts of sodium sulphate, and 100 of water; Martie, 8 parts ammonium sulphate, 2½ of sodium carbonate, 3 parts boracic acid, 2 of borax, 2 of starch, and 100 of water. And very recently it has been suggested to use a solution of magnesium chloride. . . .

All doors contained in "fire-walls" should have springs or weights attached to them, so as to be at *all* times closed. Fire-doors can be shut automatically by a weight which is released by the melting of a piece of very fusible solder employed for this purpose. "So sensitive is this solder that a fire-door has been made to shut by holding a lamp some distance beneath the soldered link and holding an open handkerchief between the lamp and link. Though the handkerchief was not charred, hot air enough had reached the metal to fuse the solder and allow the apparatus to start into operation."

These solders are alloys more fusible than the most fusible of their component metels. A few of them are: Wood's alloy consisting of:

Cadmium,	1 to 2 parts.
Tin,	2 parts.
Lead,	4 parts.
Bismuth,	7 to 8 parts.

This alloy is fusible between 150° and 159° Fahrenheit. The fusible metal of d'Arcet is composed of

Bismuth,	8 parts.
Lead,	5 parts.
Tin,	3 parts.

It melts at 173.3°. We can, therefore, by proper mixture, form a solder which will melt at any desirable temperature.

PAINTING IRON SURFACES.

CONTINUALLY growing in importance as iron becomes more and more an every-day building material is the best method of preserving it by paint, the various chemical methods of rust-prevention being as yet too imperfect and too expensive for ordinary use. The following extracts from a paper read by Mr. William Meeking, before the Civil and Mechanical Engineers' Society, London, furnishes some technical points of interest in relation to this subject. It says:

Of the varieties of lacquers and paints used it is needless to speak at length as the all-important point is the actual state of the iron surface when the first coat is laid on. If that is not in proper condition no subsequent application, however good in itself, has any chance of being permanently preservative, and I think that that proper state is found when there has been formed upon the whole surface of the work a thin layer of the first or black oxide, which has been, while hot, thoroughly permeated by and incorporated with a resinous and tarry covering. Once formed, everything goes well. Additional coats of paint may be applied from time to time to renew the thickness of the original covering, but the iron underneath remains unattacked. If, on the contrary, a film of hydrate oxide (ordinary rust from exposure) be once allowed to form, the successive coats of paint are thrown off sooner or later, and, in the meantime, the rust has spread under the paint. A striking instance of this may be generally seen after outdoor riveted work has been in place for some time. As a rule all the riveting is done before the final painting is commenced, and each rivet-head has in the meantime been exposed to a damp atmosphere: the paint invariably commences to peel off the rivet-heads long before it leaves the adjacent plates, and when this has once taken place nothing but a thorough scraping off of the surface will give the paint any chance of adhering. So slight are the differences of manipulation which determine whether a given piece of work shall or shall not rust away, that I think they may all be found in the different methods of manufacture pursued now and formerly. Taking the case of a piece

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of ornamental iron-work, which in so many instances has come down to us in unimpaired beauty and condition, it would be now probably forged in detail in one part of a factory, drilled, filed and fitted in another, and when completely finished be painted "in three coats of best oil paint." Formerly the smith who forged the work punched the necessary holes at the same time, fitted his various pieces together as he went on, completing each piece as he proceeded, doing all the work with his hammer, and, to quote an old book of direction to good smiths, "brushing his work over with linseed oil, and suspending it for some time over a strongly smoking wood fire." This will give at once a sort of elastic enamel coat, perfectly adherent, calculated to preserve the iron to the utmost.

To come to practical uses: it appears to me, first, that in all cases where iron is used externally there should be the most careful provision made for draining off water, and preventing any lodgment in inaccessible places; second, that the iron used should be in the largest and most compact masses possible, with a due regard to the necessities of construction, avoiding, by all means, such designs as are calculated to provide the largest possible surface for a given weight of metal; third, to take care that, before the metal leaves the iron-works, and while heated, it receives a coat of some protective substance, such as tar or linseed oil, which shall be allowed to incorporate itself with its external surface and form a durable substratum for future coverings.

MONTHLY CHRONICLE.

July 1. Wind-storm strikes Coalville, Pa. Two persons killed, twenty-five wounded.

July 4. The "*Scioto*," excursion steamer, is run into and sunk on the Ohio. About sixty lives lost.

July 6. At Buenos Ayres, during the celebration of memorial services for Garibaldi, a fire catches a lodge curtain and causes a panic. Twenty persons killed.

July 11. Death of Arthur Gilman, architect, of New York.

Alexandria is bombarded by the English fleet.

July 12. A three-story brick building at Texarkana, Ark., being struck by lightning falls onto and crushes an adjoining saloon, which then takes fire. Thirty lives lost.

Serious gas explosions in Paris. Twelve houses destroyed. Twenty persons killed and many injured.

July 13. Preliminary dedication of the Hôtel de Ville, Paris.

July 19. Severe earthquake shock felt in the city of Mexico. Many walls fall. No one injured. The shock was more severe in towns farther south.

July 20. Slight earthquake shock felt at Cairo, Ill.

July 24. Death of Robert Briggs, C. E.

CARPET DESIGNS.

Brooklyn.

To the Editors of the American Architect: —

Dear Sir, — Can you tell me to what scale carpet designs are usually drawn, and in what essentials designs for ingrain carpets differ from those for moquettes and velvets?

Yours, C.

[Ingrain carpets are designed at one-half the full size. Brussels designs are usually as near the full size as the dimensions of the paper will admit, about ¾. The essential difference between designs for ingrain carpets and moquettes and velvets is that the number of colors in the latter is unlimited, while in the former it is restricted to the comparatively small variety which can be introduced in the warp and filling of a two or three ply fabric. — Eds. American Architect.]

NOTES AND CLIPPINGS.

A Peculiar Electric-Light Accident. — A London exchange tells how an accident of a peculiar character occurred lately at Brighton. While the members of the local volunteer fire-brigade were proceeding up North road with their fire-escape, it came in contact with the electric-light wire overhead, and the electric fluid descending the wire-work of the escape, caused those volunteers who were holding it to lose their control. Another member, thinking the machine was falling, grasped the steering-rod, and received the full force of the electricity, which was so powerful as to bend him double and disable him for upward of an hour.

Over Five Thousand Electric-Lights in One Building. — The Mills Building, Wall and Broad Streets, New York, has been wired for 5,588 Edison lamps. As this is the largest enterprise of the kind ever undertaken the details may prove interesting. The conductors consist of 1,650 feet of Edison's patent electric tubes, 628 feet of lead pipe containing taped wires thoroughly insulated, 23,058 feet of zinc tubes, 75,909 feet of wire conductors, and 24,162 feet of wooded receptacles, placed between the floors, to hold the system of distributed wires. The total amount of wires used was 3,774 pounds, besides 48 vertical main cut-outs, and 253 division cut-outs. — *Scientific American.*

A Memorial Tablet to Garibaldi. — A striking bit of history is told by the inscription on the marble tablet erected the other day in a room of a house in Velletri, Italy, by the authorities of that notable little city: "In this chamber," it reads, "Ferdinand II, of Bourbon, on the night of XVII May, MDCCCXLIX, in face of a few regiments of volunteers, in vain sought to sleep in the midst of an army. Here reposed victorious, on the following night, Giuseppe Garibaldi. Pius IX, returning from Portici to Rome, here dreamt of grandeur and stability of government among foreign swords. Here returned in MDCCCLXXV, and here, the country free and secure, slept Giuseppe Garibaldi. And here no one will ever sleep again."

Flameless Combustion. — A new theory of combustion was practically illustrated by Mr. Thomas Fletcher, of Warrington, at a soirée of the Society of Chemical Industry at Owens College, the results being so totally unexpected that many present would, and in fact did, go away with the impression that some deception was being practised. Mr. Jacob Reese, the inventor of the Reese fusing disc, has stated his belief that if it were possible to produce combustion without flame, the temperature and duty obtained from any fuel would be enormously increased. It has remained for Mr. Fletcher to not only prove the possibility of flameless combustion in more than one form, but also to demonstrate practically the enormously high temperatures which can be obtained by this means. Taking a ball of iron wire about three pounds in weight, Mr. Fletcher placed it on a slab of fire-clay, and directing a blowpipe flame on it for a few seconds he suddenly blew the flame out. The temperature increased so rapidly that in a few seconds the wrought-iron fused and ran into drops, and this temperature was steadily maintained. The room was darkened, but the closest examination did not show a trace of flame, although the fact that the gas was burning was proved by repeatedly relighting and extinguishing it. The same experiment was repeated in another form by directing the flameless heat into a small fire-clay chamber, in which a refractory clay crucible, made specially for nickel melting, was partially fused and worked into a ball like soft putty, the sides of the fire-clay chamber being at the same time fused. The heat was so tremendous that the blowpipe laboratory, which was given up to Mr. Fletcher for the evening, was much too hot to be agreeable, in spite of open windows and ventilators. How far this discovery can be utilized remains to be seen, but it would appear that the presence of flame, usually considered to be a sign of combustion, is really an indication of imperfect results, and the best duty is to be obtained only when flame is totally absent. It is certain that such temperatures as those obtained by Mr. Fletcher without flame have never previously been obtained with the fuel used, which was nothing more than a small gas-supply for a quarter-inch pipe, assisted by an air blast. — *The Architect.*

The Earthquakes in Italy. — A correspondent at Sienna gives us further details of the earthquakes in Tuscany. Between thirty and forty shocks were felt during the visitation, lasting from the morning of Tuesday, the 11th, until Wednesday night. The earthquake began about 10 o'clock on Tuesday morning with two slight shocks, followed half an hour later by two others so strong that the soldiers were all turned out of the barracks, and the people rushed out of the houses on to the Lizza for safety. The houses rocked; the plaster came tumbling down the chimneys. The shocks were repeated, some strong, some weak, throughout the day at intervals of a quarter to half an hour. Sienna was in a panic: the bells were rung; the thrice-holy Madonna del Vuoto was uncovered. Some of the nobility, afraid of their own houses, had their carriages dragged on to the Lizza and slept there in the open air. At 2 o'clock in the morning there came a shock so strong and terrifying it was as if a mine had been sprung under the city. After that the force of the concussions decreased. On Wednesday the shocks were slighter and less frequent, as though an invisible charge of cavalry was passing by. By night there was no rocking, the bells had ceased to peal, the prayers became less stringent; and so (says our correspondent) you may safely "recommend the uncovering of the Madonna as a good recipe. As to the causes of the phenomenon, there can be no doubt that it was owing to the municipality having put up two tablets to Garibaldi the week before." — *Pall Mall Gazette.*

Discovery of Mural Paintings near Corinth. — Eastward from the site of Corinth workmen in making a road broke through a tomb at a place called Megali Porta. Three sides were destroyed, and the tomb was empty. The fourth side offers a very rare specimen of Greek art — namely: mural paintings. The wall is divided into four parts, of which the uppermost has squares containing pictures of grapes and birds. In the third row are three small niches with three well-preserved paintings of figures between them. In the fourth and lowest division are fruits in baskets, and birds which eat or drink from vessels. In the second row is a continuous series of scenes. One represents the funeral feast. A table is the centre, around which a helmeted figure and others are lying in the attitude assumed by the ancients at their meals. He is nude to the waist, and has a white cloth over his legs. Another male figure (nude) stands at the foot of the couch. Other figures appear to be in violent emotion, perhaps of grief. The Archæological Museum of Athens has had a copy made by Professor Lytras in order to preserve a record of the color of the paintings, as well as of the scenes in so far as they can be made out. — *Chicago Tribune.*

Old Wooden Bolts in Housebuilding. — Why do you make so lavish a use of nails in the carpenter's work of our houses, to the exclusion of the honest old oaken pin? Pull down any building, if it be merely a barn, of more than two hundred years old, and you will not find a single nail in the original work: rafters and joists were all bolted together so stoutly as almost to defy the tools of the destroyer. Many an old manor barn, when pulled down of late years — as unfortunately only too many of them have been — has shown itself to have been better built than most palaces are now. There are arguments in the way of economy of time and so on in favor of the use of nails in housebuilding, but they are as nothing compared with the solid advantages of using wooden bolts. The iron nails in time canker and rot rafters and floors, but bolts hold them together "like grim death," and render a house practically indestructible. — *Exeter Flying Post.*

The London Custom-House. — It is said that the Custom-House at London is to be sold, although the site upon which it stands has been used for the purpose for five centuries. The present building was erected sixty-eight years ago and cost £2,500,000.

A Berlin Tenement. — It is said that in one building in Berlin — a lofty double house with a rear house connected — 1,258 persons make their home.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

261,838. HEATER. — Stephen Ducolin, Norwood, N. Y.

261,843. FIRE-LADDER. — David Friedheim, New York, N. Y.

261,847. FIRE-ESCAPE. — John Graff, New York, N. Y.

261,874. FIRE-LADDER. — George W. Rich, Portland, Me.

261,877. SASH-BALANCE. — S. Howland Russell, New York, N. Y.

261,879. APPARATUS FOR HEATING AND VENTILATING BUILDINGS. — Isaac D. Smead, Toledo, O.

261,880-881. ELEVATOR. — William Stephens, Philadelphia, Pa.

261,884. HEATER. — Robert M. Weir, Boone, Io.

261,911. BRICK-MACHINE. — Jas. C. Conroy, Allegheny, and Henry D. Kilgore, Pittsburg, Pa.

261,921. VENTILATING WINDOWS. — Herman Hart, Muncie, Ind.

261,925. SCREW-DRIVER. — Eduard Herzie, Jersey City, N. J.

261,932. SAW-HANDLE. — Carey W. Knapp, Geneva, O.

261,945. HOT-AIR REGISTER. — Walter C. Munson, Brooklyn, N. Y.

261,968. KNOB-ATTACHMENT. — Warren H. Taylor, Stamford, Conn.

261,972. WATER-ELEVATOR. — John S. Wallace, Nelsonville, O.

261,974. WATER-CLOSET. — Peter White, St. Louis, Mo.

261,991. WASH-STAND. — Nathan O. Bond, Fairfax Court-House, Va.

262,005. DOOR-SPRING AND PNEUMATIC DOOR-CHECK. — Walter C. Clark, Auburndale, and Edward W. Gillon, Boston, Mass.

262,007. SUBTERRANEAN DUMB-WAITER. — John L. Connable, Xenia, O.

262,038. SASH-FASTENER. — William P. Hayhurst, Argentine, Kan.

262,068. DOOR-HANGER. — Timothy Lynch, Dundee, N. Y.

262,120. DOOR-HANGER. — Henry E. Richards, Ottawa, Ill.

262,133. ARTIFICIAL PAVING AND BUILDING MATERIAL. — Alexander L. Scott, Philadelphia, Pa.

262,154. ELEVATOR. — Charles H. Vincent, Lynn, Mass.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report twenty-one permits have been granted, the more important of which are the following: —

T. H. Morrow, 2 two-st'y brick buildings, Comb Alley, between Hill and York Sts.

C. H. Pindell and T. H. Frisby, 8 two-st'y brick buildings, Paca St., between West and Stockholm Sts.

W. A. Hanway, 5 three-st'y brick buildings, Roberts St., between Druid Hill Ave. and Etting St.

G. F. Bachman, 3 two-st'y brick buildings, Poultney St., e of James Alley.

Boston.

BUILDING PERMITS. — *Brick.* — *Chardon St.*, near Hawkins St., Ward 7, for S. H. Beals, six-st'y mercantile, 85' x 114' and 118'; T. J. Whidden & Co., builders.

Columbus Ave., B. & P. R. R. yard, for B. & P. R. R. Co., Truck offices, 17' 6" x 32'.

Washington St., Nos. 2157-2163, cor. Winthrop and Winslow Places, Ward 19, for Wm. Sheafe, five-st'y stores and tenements, 51' 9" and 52' 8" x 150'; J. W. Coburn & Co., builders.

Winthrop Pl., near Washington St., Ward 19, for Wm. Sheafe, four-st'y dwell., 44' and 47' x 46'; J. W. Coburn & Co., builders.

East First St., rear, opposite N St., Ward 14, for City of Boston, two-st'y mansard stable, 36' x 56'; Dady & Flint, builders.

House of Correction Grounds, two-st'y mansard stable, 36' x 56'; Dady & Flint, builders.

Atlantic Ave., rear 366 Foster's Wharf, Ward 12, for Foster's Wharf Co., three-st'y stable, 32' x 34'; Wm. M. Rumery & Co., builders.

Brooklyn.

BUILDING PERMITS. — *Berkeley Pl.*, s s, 150' e Sixth Ave., 2 three-st'y brownstone dwells.; cost, each, $9,000; owner, M. M. Vail, 151 East Sixty-first St., New York; architect, M. J. Morrill; builder, Thos. Ward.

Stagg St., e s, 200' n Bushwick Ave., three-st'y frame tenement; cost, $4,000; owner, Ellen Wilson, 250 Stagg St.; architect, G. Wilson.

Kosciusko St., s s, 125' w Tompkins Ave., three-st'y frame factory; cost, $3,000; owners, Joseph Wild & Co.; architect, J. D. Reynold; builder, T. E. Greenland.

Fourth Ave., e s, 23' n Prospect Ave., 3 two-st'y frame dwells.; cost, $1,200; owner, J. H. Watson, 421 Grand Ave.; builder, J. H. Edwards.

Stanhope St., n s, 125' e Central Ave., three-st'y frame tenement; cost, $3,000; owner, architect and builder, C. Isbill, 593 Herkimer St.

Marcy Ave., s e cor. Park Ave., one-st'y frame church; cost, $9,000; owner, Tompkins Ave. Congregation Soc.; architects, Parfitt Bros.

Herkimer St., s s, 47' e Columbus Pl., 2 two-st'y frame dwells.; cost, each, $2,300; owner, Helena Bossong, 256 Houston St., New York; architect, —— Gilbert; builders, A. Bossong and John Frye.

Greene St., No. 206, s s, 175' w Oakland Ave., three-st'y frame tenement; cost, $2,875; owner, J. Hogan, on premises; architect, —— Gamble; mason, J. Hogan; carpenters, Port & Gamble.

Chicago.

HOSPITAL. — St. Luke's Hospital will build five new buildings for hospital purposes from plans by Treat & Folz. They will be the administration building, the autopsy and kitchen buildings, and two pavilions. They are to be built on Indiana Ave., s of Fourteenth St., and to cost $150,000.

FACTORY. — Johnson & Arneson will build a four-st'y furniture factory of brick, 50' x 156', on Noble St., between Ohio and Indiana Sts., from plans by C. O. Hausen, to cost $11,000.

BUILDING PERMITS. — E. B. Sheldon, three-st'y brick flats, 25' x 40', 747 Wells St.; cost, $6,000.

Wm. Sebastian, three-st'y and basement brick stores and flats, 40' x 64', 353 and 355 Sedgwick St.; cost, $12,000.

Mrs. M. Mund, one-st'y brick store, 22' x 64', 593 Clybourn Ave.; cost, $4,000.

C. Kahles, three-st'y brick store and flats, 1019 West Madison St.; cost, $9,000.

Thomas Deady, three-st'y and basement brick store and dwell., 24' x 62', 1211 Blue Island Ave.; cost, $5,500.

Davis Studley, two-st'y brick dwell., 20' x 58', 107 Winchester Ave.; cost, $4,000.

Wm. Flanneforth, two-st'y brick store and dwell., 25' x 59', 506 Chicago Ave.; cost, $3,500.

Thorson & Tollakson, five-st'y brick factory, 60' x 70', 37-39 Armor St.; cost, $15,000; C. O. Hansen, architect.

James Otis, two-st'y brick dwell., 20' x 40', No. 2421 Michigan Ave.; cost, $7,000.

L. Warlich, additional story, 20' x 40', 39 North Clark St.; cost, $3,000.

John Beidner, three-st'y brick store and dwell., 25' x 70', 580 Blue Island Ave.; cost, $7,000.

R. M. Cherrie, two-st'y brick barn, 26' x 50', 2541 Wabash Ave.; cost, $3,500.

F. Larned, 6 two-st'y and basement brick dwells., 40' x 120', Stanton Ave.; cost, $12,000.

L. Endres, three-st'y and basement brick store and dwell., 23' x 56', 2350 Cottage Grove Ave.; cost, $7,500.

Joseph Roubick, three-st'y and basement brick store and dwell., 25' x 64', 239 West Twelfth St.; cost, $8,000.

Julius Zuehlke, two-st'y and basement brick store and dwell., 25' x 50', 1101 Milwaukee Ave.; cost, $3,000.

E. B. Sheldon, three-st'y brick flats, 37' x 45', 14 and 16 Lincoln Ave.; cost, $8,000.

Walker & Berk, four-st'y brick brewery, 48' x 80', Desplaines and Indiana Sts.; cost, $28,000.

J. W. Perine, two-st'y brick dwell., 40' x 42', 815 and 818 Hinman St.; cost, $4,000.

Rev. C. Mauerman, 2 three-st'y and basement brick dwells and stores, 50' x 70', Twenty-fourth St. and Wentworth Ave.; cost, $16,000.

J. H. Wren, two-st'y and basement brick dwell., 30' x 53', 2915 Prairie Ave.; cost, $4,000.

M. D. Wells, one-st'y addition, 65' x 99', Madison and Market Sts.; cost, $5,500.

Fred. Fraun, two-st'y brick dwell., 22' x 64', 40 Fremont St.; cost, $3,500.

Mrs. M. Topping, two-st'y brick store and dwell., 21' x 50', 1041 West Madison St.; cost, $4,000.

I. Schladweiler, three-st'y brick wagon-shop, 25' x 70', 379 West Lake St.; cost, $3,000.

John Breen, two-st'y brick store and dwell., 26' x 70', 3700 South Halsted St.; cost, $5,500.

A. M. Garner, 5 two-st'y brick dwells., 39' x 96', Selden St., near Twelfth St.; cost, $12,000.

J. E. Pritchard, two-st'y brick dwell., 21' x 46', 1230 West Jackson St.; cost, $2,500.

H. H. Nash, three-st'y brick dwell., 50' x 61'; Jackson & Roby; cost, $16,000.

Peter Johnson, three-st'y brick store and dwell., 24' x 70', 490 West Chicago Ave.; cost, $5,500.

W. Boesen, three-st'y brick dwell. and store, 22' x 36', 300 Mohawk St.; cost, $3,500.

F. Schwicktenburg, two-st'y brick dwell., 22' x 56', 680 Holt St.; cost, $2,900.

John Coughlan, two-st'y brick dwell., 24' x 47', No. 24 Meridian St.; cost, $3,500.

Ed. Ely, two-st'y brick dwell., 15' x 32', 208 Twenty-eighth St.; cost, $2,500.

J. W. Gehring, two-st'y brick flats, 40' x 60', 54 and 56 South May St.; cost, $9,000.

Frank Kaspar, three-st'y brick dwell. and store, 23' x 60', 483 South Canal St.; cost, $7,000.

F. W. Faberberg, two-st'y and basement brick store and dwell., 74 East Chicago Ave.; cost, $6,000.

Henry Beckerman, three-st'y brick dwell., 22' x 53', 28 Granger St.; cost, $4,500.

C. D. Talcott, two-st'y brick dwell., 21' x 45', No. 231 Thirtieth St.; cost, $3,000.

M. Gunderson, three-st'y brick dwell., 23' x 50', 96 Park St.; cost, $6,000.

D. V. Thomas, two-st'y brick dwell., 22' x 45', 902 Warren Ave.; cost, $3,000.

Cincinnati.

DEPOT. — Proposals will be received at the office of the Engineer and Superintendent to-day, August 12, for all labor and material required in building the foundation and first story for the new Union depot, on the southwest corner of Third and Central Aves. Work to include masonry, cut-stone, and carpenter work.

STORES. — Mr. F. Lamping is to build two stores 45' x 105', three-story, on the s w corner of Vine St. and Madison Pike; cost, $12,000; Mr. George W. Rapp, architect.

MALT-HOUSE. — Mr. Wm. Stichtennoth is remodelling his malt-kiln and ventilators on Twelfth and Clay Sts., according to plans prepared by Mr. George W. Rapp.

HOUSES. — J. M. Brunswick has commenced work on a new house on Grand View Ave., Walnut Hills. The house is to be of pressed brick and freestone. Cost, about $30,000; S. E. Des Jardins, architect.

W. H. Blymyer is to build a pressed brick dwelling-house on Beecher St., Walnut Hills. Cost, $12,000; S. E. Des Jardins, architect.

S. E. Des Jardins is preparing plans for a frame dwelling-house to be built on Lincoln Ave., Walnut Hills, for W. R. Teasdale, Esq. Cost, about $9,000.

BUILDING PERMITS. — During the past week the following permits have been issued for new buildings:

Henry Rerching, three-st'y brick dwell., Sherman St., near Dalton Ave.; cost, $5,800.

F. Hassman, three-st'y brick dwell., 116 Gest St.; cost, $2,200.

Emil Dehler, three-st'y brick dwell., Liberty St., near Elm St.; cost, $3,000.

Fred Bawmhter, three-st'y brick dwell., Gest St., near State Ave.; cost, $4,000.

E. Dalbro, one-st'y frame dwell., cor. of Freeman and Sloo Sts.; cost, $2,000.

H. Metke, three-st'y brick dwell., Poplar St., bet. Western and Dalton Aves.; cost, $4,000.

Herman Wahking, two-st'y brick dwell., Reading Road, near Shillite St.; cost, $6,000.

Six permits for repairs; cost, $6,800.

New York.

BUILDING PERMITS. — *East Ninetieth St., No.* 161, four-st'y brick and stone flat; cost, $30,000; owner and builder, John F. Gleason, 163 East Ninetieth St.; architect, L. B. Wheeler.

East Ninetieth St., No. 159, four-st'y brick and stone flat; cost, $20,000; owner, architect and builder, same as last.

West Fifty-fourth St., Nos. 149 *and* 151, 2 two-st'y brick stables; cost, each, $10,000; owner, Wm. B. Baldwin, 145 West Fifty-fifth St.; architect, Geo. B. Pelham; builders, David Kennedy and E. Corbett.

Seventy-seventh St., s s, 250' w First Ave., 3 five-st'y brick flats; cost, each, $20,000, owner and architect, Wm. F. Burroughs, Jackson Ave., near One Hundred and Sixty-first St.

West One Hundred and Twenty-fourth St., Nos. 222 *and* 224, 2 four-st'y brick tenements; cost, each, $9,000; owner, Mary McKaegney, 224 West One Hundred and Twenty-fourth St.; architect, M. L. Nugrich; builder, Patrick McKaegney.

One Hundred and Twenty-sixth St., n s, 200' e Seventh Ave., 3 three-st'y and basement brick and stone dwells.; cost, each, $8,000; owner, Adelaide Wilson, 215 West One Hundred and Twenty-sixth St.; architect, John F. Miller; superintendent, Thos. Wilson.

Ave. A, e s, 32' 3" s One Hundred and Twenty-first St., three-st'y brownstone front dwell.; cost, $8,000; owner, John C. C. Gilsey, Ave. A, between One Hundred and Twentieth and One Hundred and Twenty-first Sts.; architect, C. E. Hadden.

One Hundred and Sixteenth St., n s, 85' e Third Ave., 3 five-st'y brick flats; cost, each, $20,000; owner and builder, E. C. Coggeshall, 224 East One Hundred and Eighteenth St.; architects, Thom & Wilson.

Madison Ave., n w cor. One Hundred and Ninth St., 5 four-st'y brick tenements; cost, each, $12,000; owner, Marian E. Moore, 56 East One Hundred and Tenth St.; architects, Cleverdon & Putzel.

Third Ave., s e cor. Ninety-ninth St., 4 four-st'y brick tenements and stores; cost, each, $10,000; owner, John McGarry; architect, Andrew Spence.

Ninety-ninth St., s s, 75' e Third Ave., four-st'y brick tenement; cost, $9,500; owner and architect, same as last.

Division St., Nos. 192 *and* 192½, five-st'y brick tenement and store; cost, $12,000; owners, Sobel Bros., 162 Greenwich St.; architect, Henry Dudley; builders, Joseph Schaeffler & Son.

East Eighty-fourth St., No. 430, three-st'y brownstone front dwell.; cost, $12,000; owner, Edward H. Wallace, 420 East Eighty-fourth St.; architect, John McIntyre; masons, Robinson & Wallace.

Willis Ave., w s, 75' s One Hundred and Forty-third St., three-st'y brick dwell.; cost, $5,000; owner, Chas. Weiffenbach, 285 Penn St., Brooklyn; architects, Kerby & Archer.

West Fifty-second St., Nos. 643 *and* 645, two-st'y brick stable; cost, $4,000; owners, Canda & Kane, foot of West Fifty-second St.; builders, Murphy & McGinty.

Fifty-second St., s s, 200' e Ninth Ave., four-st'y brownstone front tenement; cost, $12,000; owner, James Gillies, 353 West Fifty-first St.; architect, Wm. Kuhles; mason, Ph. Canfield.

East Twenty-fifth St., No. 223, three-st'y brick engine-house; cost, $18,000; owner, City of New York; architects, N. Le Brun & Son.

East Ninth St., Nos. 735, 737 *and* 739, rear, four-st'y brick factory; cost, $6,000; owner, W. F. Youngs, 143 Rodney St., Brooklyn; builders, Richard Shapter and Guy Culgin.

Pier No. 28, *North River*, foot of Laight St., one and two st'y frame and galvanized iron freight-shed; cost, $30,000; lessees, Pennsylvania R. R. Co., Jersey City; architect, Jos. M. Wilson.

Tenth Ave., w s, 60' s One Hundred and Sixth St., 2 four-st'y tenements; cost, each, $10,000; owner, James McGay, 34 Greenwich Ave.; architect, Robert Black.

Sixth Ave., w s, 20' s Fifty-seventh St., 3 four-st'y brick and stone flats and stores; cost, each, $18,000; owner, Louis Leypoldt, 34 West Thirty-seventh St.; architects, Thom & Wilson; builders, John P. Schweikert and F. Beinhauer.

Tenth Ave., w s, 54' 4" n Seventy-fourth St., five-st'y brownstone front flat and store; cost, $25,000; owner, August Mehler, 813 Ninth Ave.; architects, Thom & Wilson; builders, Peter Kay and Wm. P. Mitchell.

First Ave., s e cor. One Hundred and Seventh St., four-st'y brick flat and store; cost, $15,000; owner, John Norton, 1945 Third Ave.; architect, Barth. Walther.

Third Ave., w s, 60' s of One Hundred and Fifty-second St., three st'y brick tenement; cost, $8,700; owner, John Menches, Third Ave., near One Hundred and Fifty-second St.; architect, Henry Pierney.

ALTERATIONS. — *South Fifth Ave., Nos.* 132 *and* 134, five-st'y brick extensions; owner, Amos R. Eno, by Amos F. Eno, 8 Pine St.; architect, Robert Mook; builder, James Rue.

Baxter St., s w cor. Walker St., front and gable walls to be rebuilt and interior alterations; cost, $4,500; owner, John Hooper, 65 Centre St.; lessee, Jacob Cohn; architect, John Brandt.

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Tenth Ave., No. 933, four-st'y brick extension and interior alterations; cost, $5,000; owner, Emma A. Furber, 249 West Fifteenth St.; architect, R. Rosenstock.

Monroe St., No. 332, new store front; cost, $700; owner, Patrick Carraher, 2 Goerck St.; builders, James Hamel & Son.

West Thirty-eighth St., No. 30, two-st'y brick extension; cost, $4,000; owner, Jane Jacobs, guardian, on premises; architects, Thom & Wilson; builders, C. W. Klappert's Sons.

Third Ave., e s, cor. One Hundred and Sixty-third St., two-st'y brick extension; cost, $2,500; lessees, Hebrew Orphan Asylum, Seventy-seventh St., between Lexington and Third Aves.; architects, H. J. Schwarzmann & Co.; builders, List & Lennon and C. W. Klappert's Sons.

West Fifty-second St., No. 30, one-st'y brick extension; cost, $3,800; owner, Alexander Waldron, on premises; builder, J. C. Miller.

Philadelphia.

BUILDING PERMITS.—*Gerritt St.*, s s, w of Nineteenth St., 3 two-st'y dwells., 15' x 49'; M. B. Stackhouse, contractor.

Allen St., No. 429, two-st'y stable, 33' x 50'; Wm. Cummings, owner.

Eighth St., e s, n of York St., two-st'y greenhouse, 16' x 80'; Chas. Schuck, owner.

Thirty-sixth St., s w cor. Spruce St., three-st'y dwell., 21' x 74'; W. S. Kimball, contractor.

North Fourth St., No. 923, three-st'y dwell., 19' x 64'; A. T. Richards, contractor.

Front St., e s, s of Willow St., one-st'y addition to warehouse, 32' x 58'; Reading R. R. Co., owners.

Eleventh St., s e cor. Market St., four-st'y addition to Bingham House; cost, $50,000.

Paul St., w s, s of Sellers St., 2 three-st'y dwells., 16' x 48'; E. R. Welsh.

Broad St., w s, between Reed and Dickinson Sts., 15 three-st'y dwells., 17' x 58'; W. R. Maschett, owner.

Forty-sixth St., s s, s of Baltimore Road, two-st'y stable, 20' x 52'; W. L. Atkinson, contractor.

North Ninth St., No. 2416, three-st'y dwell., 14' x 30'; Pat Byrne, owner.

Fifth St., e s, n of Cambria St., 5 two-st'y dwells., 15' x 43' and 20' x 43'; Thos. L. Kelly, contractor.

Sumac St., near Wissahickon Station, 2 three-st'y dwells., 19' x 30'; Jas. Dobson, owner.

Clearfield St., n s, e of Twenty-ninth St., 8 two-st'y dwells., 16' x 42'; Robert Manly, contractor.

Scott's Lane, near Ridge Ave., three-st'y dwell., 16' x 42'; Robt. Manly, contractor.

Philip St., w s, n of Berks St., two-st'y stable, 25' x 40'; A. Beltney, owner.

Westminster St., s s, w of Fifty-fifth St., 7 two-st'y dwells., 14' x 40'; Jas. Dobbins, owner.

Fifty-nine-and-one-half St., e s, s of Lansdown Ave., 2 two-st'y dwells., 14' x 30'; Jno. Diggle, owner.

Paschall St., s s, e of Fifty-second St., three-st'y dwell., 18' x 46'; Peter Gray, owner.

St. Louis.

BUILDING PERMITS.—Forty-two permits have been issued since our last report, twenty-one of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows, viz.:—

Jno. J. Steffen, two-st'y dwell.; cost, $3,500; contractor, Jno. J. Steffen.

Mrs. Mary Kelly, two-st'y dwell.; cost, $2,756; contractor, Michael Lane.

T. Ritchey, two-st'y dwell.; cost, $4,500; owner, Chas. Wehking.

Fred. Wetrecht, two-st'y dwell.; cost, $4,650; architect, C. H. May; contractor, Wm. Kerksieck.

J. C. Nuelsen, three-st'y dwell.; cost, $4,000; contractors, Beckmeier & Reithmann.

S. M. Taylor, two-st'y dwell.; cost, $4,500; architect, J. B. Legg; contract sub-let.

S. M. Taylor, two-st'y dwell.; cost, $4,500; architect, J. B. Legg; contract sub-let.

Board of President and Directors of St. Louis Public Schools, one-st'y school house; cost, $7,000; architect, Kirchner; contractors, Beckmeier & Riethmann.

Dr. Morgner, two-st'y tenement; cost, $3,500.

H. F. Bubke, two-st'y dwell.; cost, $5,000; contractors, Grünewald & Winde.

J. W. Fitzgerald & Co., two-st'y dwell.; cost, $5,000.

St Louis Gas-Light Co., two-st'y stable; cost, $5,000.

H. Wiehe, two-st'y dwell.; cost, $3,000; contractors, Torwegge & Wamhoff.

J. Tutlow, two-st'y dwell.; cost, $2,500.

J. Pullis, 3 two-st'y dwells.; cost, $11,000; contractor, S. H. Hoffman.

Mrs. Myers, 3 two-st'y dwells.; cost, $10,900; architect, A. Beinke; contractor, M. Kirkwood.

H. Reichardt, two-st'y dwell.; cost, $2,600; contractor, Wm. Gahl, Jr.

General Notes.

BATH, L. I.—The private hotel of Mr. Joseph Lowry is to have a three-st'y and basement addition, 50' x 200', which will include a ball-room, billiard-room, etc. The extension will give a frontage on the ocean of 260'; Mr. Jas. Stroud, of New York, architect.

LAWRENCEBURGH, IND.—Mr. Samuel Godley, architect, of Cincinnati, is preparing plans for the following work in this city:

Church for the Presbyterians, 30' x 50', brick, seating 250; cost, $8,000.

Christian Church, brick, to seat 250; cost, $5,000.

Two brick houses for the city authorities, for steam fire-engine purposes, costing each $4,000.

PUTNAM, CONN.—Rumor says a block is to be built on the lot where the post-office now stands.

UTICA, N. Y.—A two-and-one-half-st'y frame dwelling-house, measuring 38' x 60', is to be built on Park Ave., for Mr. V. B. Stewart, at a cost of $6,000; Mr. F. H. Gouge is the architect; Messrs. Bamigan & Weber are the contractors for mason-work, and Walter Embley the contractor for carpenter-work. Work is begun.

A stone church for the West Utica Presbyterian Society, measuring 54' x 86', is to be built on Court and Garden Sts., at a cost of $25,000; Mr. Fred. H. Gouge is the architect; Messrs. Hughes & Jones are the contractors for the mason-work, and Messrs. Williams & Roberts contractors for carpenter-work. Work to begin immediately.

WALLINGFORD, PA.—Dr. Essig has commenced to build a three-st'y dwell.; first story of brick, and frame above; to cost about $10,000; A. W. Dilks, architect, Philadelphia; G. W. Parlett, contractor.

WESTMINSTER, CARROLL COUNTY, MD.—Additional record rooms to court-house, to be fire-proof, built of brick and stone, and have concrete covering with asphalt roof; Mr. Thos. Dixon, Baltimore, architect.

WYOMING, O.—Mr. A. C. Nash, architect, of Cincinnati, is preparing plans for a Baptist church, to be built at Wyoming, near Cincinnati. The building will be frame, 35' x 81', with lecture-room attached; cost, $8,000.

PROPOSALS.

SCHOOL-HOUSE.
[At Boston, Mass.]

Sealed proposals will be received at the office of city architect **until Tuesday, August 15, at 12 o'clock, M.**, for furnishing all materials and doing all the labor required to build and complete a grammar school-house, of brick, on Kenilworth St., Ward 21.

Separate proposals required for carpentry and masonry.

Proposals to be addressed to the undersigned and indorsed "Proposal for building grammar schoolhouse, Kenilworth Street."

The committee reserve the right to reject any or all proposals received.

For plans and specifications apply at the office.

For the committee,
346 WILLIAM WOOLEY.

CITY HALL.
[At Kansas City, Mo.]
CITY CLERK'S OFFICE,
CITY OF KANSAS, KAN.

Sealed proposals will be received at the office of the undersigned **until 12 o'clock, noon, of August 16, 1882,** for excavating, furnishing materials and completing a city-hall building for this city.

Plans and specifications on file in this office, and also in the office of the architect, George L. Carman, 14 Journal Building, Kansas City, Mo.

Each bid must be accompanied by a certified check in the sum of $300, as a guarantee that the bidder will enter into contract with the city in the event of its award to him.

The council reserves the right to reject any or all bids.

346 H. C. STOUT, City Clerk.

STEAM-HEATING.
[At New York, N. Y.]

Proposals will be received at the office of the Department of Public Charities and Correction, No. 66 Third Ave., **until August 18, 1882,** for steam-heating and plumbing work to be done in the east wing to insane asylum on Ward's Island. For full information see *City Record*, for sale at No. 2 City Hall.

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HOOK-AND-LADDER HOUSE.
[At New York, N. Y.]

Sealed proposals will be received at the office of the Fire Department **until August 16th, 1882,** for building a house at No. 195 Elizabeth St., for Hook and Ladder Co. No. 9. For full information see *City Record*, for sale at No. 2 City Hall. 346

LUMBER, ETC.
[At New York, N. Y.]

Proposals will be received at the office of the Department of Public Charities and Correction, No. 66 Third Ave., **until August 18, 1882,** for groceries, dry goods, leather, straw and lumber. For full information see *City Record*, for sale at No. 2 City Hall.

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RAILROAD SHOPS.
[At Ionia, Mich.]

Sealed proposals will be received **until 6 P. M., August 15, 1882,** for building and finishing new shops, etc., at Ionia, Mich., for the Detroit, Lansing & Northern Railroad, consisting of a machine-shop, 110' x 250'; a transfer pit and table, 60' x 278'; a car repair and paint shop, 80' x 280'; a boiler-house, 45' x 45', with chimney 100' high; and round house 250' in diameter, and a store, 20' x 100'; also, sewers, steam-heating, etc.

Plans and specifications can be seen at the office of the engineer, at Ionia, on and after August 5, 1882.

No proposal will be considered unless accompanied by a bond of $1,000, with at least two good sureties, to be approved by the general manager of the road, that the parties bidding will enter into a contract, and furnish satisfactory security in the sum of $25,000, that they will complete the work at the prices stated in their proposal.

The company reserves the right to reject any or all proposals.

The proposals to be endorsed "Proposals for Ionia shops," and addressed to J. J. McVean, engineer, Ionia, Mich., or to the undersigned at Detroit, Mich.

For further information apply to the engineer of the company at Ionia, or to E. B. Arnold & Co., architects, Bay City, Mich.

J. B. MULLIKEN,
346 General Manager.

BRIDGE ARUTMENTS.
[Near Miami, O.]
AUDITOR'S OFFICE, HAMILTON COUNTY, O.,
CINCINNATI, July 28, 1882.

Sealed proposals will be received at the Office of the Commissioners of Hamilton County, O., **until Wednesday, August 23, 1882, at 12 o'clock, M.**, for the building of abutments and wing walls of a bridge over the C., I., St. L. & C. R. R., on Cliff Avenue, in the hamlet of North Bend, Miami Township, Hamilton County.

The work is to be done in accordance with the specifications on file in the office of the County Commissioners. The right to reject any or all bids is reserved.

W. S. CAPPELLER,
347 County Auditor.

PROPOSALS.

COURT-HOUSE, ETC.
[At Washington C. H., O.]
WASHINGTON C. H., August 2, 1882.

Notice is hereby given that sealed proposals will be received at the Auditor's office at Washington C. H., O., **up to 1 o'clock, P. M., on the 31st day of August, 1882,** for the furnishing of materials and labor required in the construction of a court-house, jail and sheriff's residence for Fayette County, O., as per plans and specifications by D. W. Gibbs & Co., architects, now on file at the Auditor's office of said county.

Each proposal must be accompanied by a good and sufficient bond in the sum of one thousand dollars, conditional that if awarded the work, he or they will enter into contract and give the bond required in specifications. Blank bids will be furnished by the Auditor.

Court-house to be fire-proof, and will be constructed separate from jail and residence.

The right reserved to reject any or all bids.

By order of the Commissioners.

347 J. P. ROBINSON, Auditor.

WATER-WORKS.
[At Sherburne, N. Y.]
SHERBURNE, N. Y., July 22, 1882.

Sealed proposals will be received **up to 12 M., of August 19,** by the Board of Water Commissioners, for the material and labor necessary in constructing the proposed water-works, at which time the bids will be publicly opened and announced.

Bids to be made on forms furnished by the Commission, and to be accompanied by a certified check or draft, payable to Treasurer of Sherburne Water Commission for two hundred and fifty dollars ($250); in case of an award the party will be required to enter into contract, or forfeit the above amount.

Amount of expenditure contemplated, about $25,000.

Specifications can be obtained from the Commission, and plans and drawings inspected at the Powell House, in the Village of Sherburne, on and after July 25, 1882.

The Board reserves the right to reject any or all bids, should they deem it for the interest of the village so to do.

ISAAC PLUMB,
SYLVANUS C. WATERS,
WM. M. BULLIS,
WM. E. DAVIS,
JESSE H. SHEPARD,
} Commissioners.

P. H. BAERMANN,
346 Consulting Engineer, Troy, N. Y.

IRON ROOF.
[At Albany, N. Y.]
NEW CAPITOL,
OFFICE OF THE SUPERINTENDENT,
ALBANY, N. Y., July 20, 1882.

Sealed proposals will be received at this office (where proposal blanks can be procured) **until 12 o'clock, noon, Friday, August 18, 1882,** for furnishing and putting up all the iron-work required to build the roof of the west front (including both pavilions) of this building, in accordance with plans and specifications now to be seen at this office. Said work is to be completed on or before the 1st day of February, 1883.

Each bid must be enclosed in an envelope, addressed to the undersigned, indorsed "Proposal for Iron Roof," and must be accompanied by bonds of two sureties, residents of the State of New York, each to the amount of $10,000.

Said sureties are to guarantee that the bidders will execute a contract if it is awarded to them, and will perform the same faithfully in accordance with the plans and specifications. The right is reserved for the Superintendent, with the concurrence of the New Capitol Commission, to reject any or all bids, and, after a contract is entered into, to declare said contract forfeited, whenever, in their judgment, it is not being performed for the interest of the State.

JAMES W. EATON,
346 Superintendent New Capitol.

RIP-RAP.
[At Nantucket, Mass.]
UNITED STATES ENGINEER OFFICE,
NEWPORT, R. I., July 31, 1882.

Sealed proposals in triplicate, addressed to the undersigned, will be received at this office **until 12 o'clock, M., August 16, 1882,** for about 16,000 tons of rip-rap granite, in lots of 2,000 tons or more, for the jetty at the entrance to Nantucket Harbor, Mass.

For form of bids or any other information apply to this office.

G. K. WARREN,
346 Lieut.-Col. Engineers, Brevet Maj.-Gen. U. S. A.

BUILDING.
[At Benton Harbor, Mich.]

On and after August 3, 1882, we will be prepared to receive bids for the erection of a two-st'y and basement brick building, 85' x 125', at Benton Harbor, Mich. Plans and specifications can be seen at our office in Benton Harbor.

345 PITCHER, JONES & SONNER.

SCHOOL-HOUSE.
[At Dunkirk, O.]

Sealed proposals will be received at the office of the Board of Education **up to 12 M., August 31, 1882,** for furnishing materials and performing work in the erection of and completing a union school-building according to plans and specifications to be on file at said office on and after August 23, 1882.

Each proposal for the several parts of the work to be made separate, as follows:—

Excavation.
Brick, rubble and cut-stone work.
Carpenter and joiner work and iron-work.
Galvanized iron, slate and tin work.
Painting and glazing.
Plastering.

The contract to be let separate or under one contract, the Board reserving the right, also, to reject any or all bids.

The names of the sureties to accompany each bid, that a contract may be entered into in case said contract is let. For further information address JOSEPH H. SWORLIM, Clerk; or J. C. HOLLAND, Architect, Ada, Ohio. 346

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co. No. 347.

AUGUST 19, 1882.

Entered at the Post Office at Boston as second-class matter.

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AN ILLUSTRATION of the possible dangers of the system of public steam-supply which is now rapidly coming into vogue, is furnished by an accident occurring this week at Lynn, Mass. In that town steam has been supplied for some time to customers by means of pipes laid in the streets, and on Monday morning one of the street mains blew up with a loud explosion, hurling stones and gravel in every direction to a distance of forty or fifty feet. Nearly every window was broken in the neighboring buildings, and some of these received other injuries, while a woman who happened to be passing by was seriously hurt. The accident is explained by the daily papers, in their usual satisfactory manner, as having been due "to accumulation of water in the pipes." It seems that this is the third explosion of the same kind which has taken place in Lynn within two weeks. After the first one an engineer was discharged on the ground that his carelessness in "allowing water to stand in the pipes" had caused the accident, but he appears to deny his guilt, and says that "the system of pipe-laying is not correct." If we were not afraid of hurting the feelings of the stockholders of the Citizens' Steam Company, we should say that both these explanations were simply ridiculous, and that the obvious cause of the explosion was the inability of the pipes to resist the strain upon them. Whose fault this may have been we do not care to inquire, but we may suggest that it would not be very difficult to ascertain in case of need. Meanwhile, we trust that the engineers of the new steam-heating companies in other cities are laying pipes which they are sure will not burst out of resentment at being improperly laid, or because of water being allowed to stand in them. An explosion in Broadway, for instance, would be a serious matter, even if it amounted only to the hurling of a few hundred paving-stones over the passers-by and through the plate-glass show-windows which line the street.

BUT while we hope that the Broadway steam-pipes may be stout enough to do their work for many years to come, the worst catastrophe that a defect in them could occasion would be insignificant in comparison with the explosion of a main pipe in the Prall system of distribution of superheated water, which was once discussed in New York, but seems now to be happily abandoned. Remembering that a given body of steam at a pressure of one hundred and fifty pounds to the square inch would expand on being set free only to five or six times its previous bulk, while an equal body of water under the pressure proposed in the Prall system would expand at the instant of the breaking of a pipe to at least five thousand times its original volume, the comparative violence of the two kinds of explosion will be sufficiently manifest. Even the firing of an equal bulk of gunpowder would produce less effect than the sudden setting free of a column of water heated to four hundred degrees Fahrenheit, and if the bursting of an ordinary steam main is sufficient to throw the stones and earth of the street above it through the topmost windows of the abutting houses, that of a hot-water pipe of equal capacity would not leave a building standing along the line of its course.

ONE of the disadvantages of the division of public works among a number of independent, not to say hostile, boards is to be observed in Philadelphia, where the chief of the Water Department is laying main pipes directly through the sewers, and in answer to the indignant remonstrances of the Board of Health coolly explains that "he did not put the sewers there," and that as to carrying the pipes over or under the sewers, "no one has told him to do so," and consequently he must leave them where they are. The Board of Health has indeed requested him to modify the level of the mains, but "the Board has no authority in such matters." It seems that the powers of the Board are restricted to curing an evil, instead of preventing it, but that after some one has drunk enough of the sewage delivered through the pipes to kill him it will have authority to compel a change. If this is the way in which Philadelphia is governed, we hope the residents along the line of the new pipes who will be obliged to drink the water will arrange to have some human sacrifice made at once to appease the dignity of the Water Board, and thereby gain safety for themselves and their families. As the Roman hero, dressed in full armor, and surrounded by his worshipping fellow-citizens, jumped into a crevasse to satisfy the anger of the infernal gods, so some Philadelphia Curtius might gain everlasting fame by walking every day, escorted by a procession of the grateful inhabitants, to drink from the Market Street hydrant the draught which Dr. McFadden and his coadjutors have prepared for their unfortunate dependants.

PREPARATIONS are making for a serious contest among the various electric-light companies, involving the right to make and sell lamps whose illuminating portion consists of a filament of carbon, heated to incandescence in an exhausted glass globe by means of an electric current. At present, although at least four varieties of the incandescent lamps are made and extensively used, under the names of different patentees, the Edison Company claims to own the exclusive right to the manufacture, by reason of the priority of its patents. Hitherto, the Edison Company, being occupied with other matters, seems to have taken no steps to make its claim good, unless the rather discreditable squabble with the United States Company at the time of the Electrical Exhibition in Paris could be called a legal measure, but it has never failed to assert it in the most sweeping terms. Every one knows the appearance of the Edison lamp, with its pear-shaped bulb of clear glass, containing a loop of blackened bamboo fibre. The Maxim lamp which is, next to the Edison, most used in this country, has a loop of charred card-board, to which consistency has been given by heating in hydro-carbon vapor so as to precipitate finely divided carbon in its pores, enclosed in an oblong bulb of opal or ground glass; the Swan lamp employs charred cotton thread as a conductor, and the Lane-Fox, which, with the Swan lamp, is generally used in England, uses the root-fibres of Italian grass, strengthened, like the Maxim card-board filament, by heating in hydro-carbon vapor. Of these forms, the Edison, although of very recent invention, is said, probably with truth, to have been the first of the kind patented in the United States, and his company claims that the manufacture or use of any similar apparatus in this country infringes those patents, which cover all electric-lamps having a continuous conductor, of any material whatever, and an exhausted enclosed globe.

ON the other hand, the owners of the Maxim, Lane-Fox and Swan patent rights claim that the use for illumination of carbon confined in an exhausted glass globe, and rendered incandescent by an electric current, is by no means new. Mr. Swan professes to have exhibited a series of such lights twenty years ago, long before the introduction of cheap magneto-electricity rendered them of practical importance, and the original invention is ascribed to a much earlier date. Under the laws of this country priority of invention is indispensable to the maintenance of a patent, and proof of the public exhibition of an apparatus essentially similar to the Edison lamps twenty years ago would probably serve to annul the monopoly granted to him. There is said to be, however, another claim adverse to the Edison patent, which would even more certainly destroy its validity. It is asserted that some years ago a young man named Freeman, of Racine, Wisconsin, who was engaged in business as a practical electrician, fitting up burglar-alarms, call-bells and so on, and occupied his leisure moments with

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original experiment, contrived a lamp consisting essentially of a luminous filament enclosed in an exhausted receiver. This was exhibited to many persons in Racine a year before the supposed date of Edison's invention. The story goes on that Freeman, pleased with the success of his idea, sent one of his lamps to Edison, who immediately appropriated the invention and patented it as his own. Some time afterwards, Freeman was employed by the United States Electric-Lighting Company, which owns the Maxim patent, as an electrician, and his claim against the Edison monopoly becoming known, the company undertook to prosecute it, and has already taken the depositions of many witnesses, preparatory to the entry of a suit in the United States Circuit Court in Wisconsin. Unless this suit is compromised or abandoned, it may prove to be the opening of a long series of struggles between some of the richest corporations in the country. The stockholders of the Edison Company have spent millions of dollars in the mere preparations for reaping the fruit of the monopoly which they believe that they own, and they will not abandon their investment without a struggle which they are well able to make a long and fierce one; while the United States Company, as well as the Brush Company, which is interested in the Swan patents, are not only rich, but enjoy the advantage over the Edison Company of possessing a very profitable independent business, from which they can draw funds to prolong the battle to extremity.

An important measure was passed in Congress just before the adjournment, providing for the appointment of a special committee to examine the course of the lower Mississippi, from Cairo to New Orleans, inquiring into the actual effect of the jetties in deepening the water at the mouth of the river, and investigating the other works of improvement now in progress, with a view to the presentation of a report at the next session of Congress which would express, if not the opinions of experts, at least those of intelligent and unprejudiced men, and would command the respect and confidence of the public, which is now so confused and disgusted by the disputes of the promotors of rival plans for improvement as to regard the whole subject with suspicion, if not aversion. The members of the committee are Messrs. Burrows of Michigan, Butterworth of Ohio, Hiscock of New York, Holman of Indiana, Carlisle of Kentucky, Hazelton of Wisconsin, Robinson of Massachusetts, Ellis of Louisiana, and Thomas of Illinois. Most of these are men of the highest ability and distinction, and their report will have deserved weight.

A pleasant entertainment was given not long ago at Frankfort-on-the-Main, in honor of Herren Wallot and Thiersch, the winners of the two equal first prizes in the great competition for the German Parliament-house. Both of the gentlemen are well-known in Frankfort, Herr Wallot having practised there for several years, while Professor Thiersch has spent much time in the city. The Society of Architects and Engineers united with the Association of Artists for the occasion, and were joined by many members of other local scientific and artistic bodies. The two guests of the evening were received in the name of the assembly by the distinguished Herr Lewald, President of the Society of Architects, and were presented with wreaths of laurel, as well as with more enduring marks of respect and regard, and the rest of the day was spent in friendly congratulation and enjoyment. It is much to be wished that such examples as these might be more imitated in this country. There is no want of mutual sympathy and regard among the architects, but occasions for showing it are not so common as they should be. It is true that the winner of competitions like that for the Garfield Memorial of San Francisco, or the Texas State House, would regard the celebration of his victory by his fellow architects as the reverse of complimentary, but even here a respectable trial of skill sometimes occurs, and it would certainly do nothing to lessen the importance of the subject in the eyes of the public to see that the profession took an interest in such contests.

After a good deal of discussion, a plan has been arranged by which associations of workmen will be admitted to compete for public contracts in Paris. It will be remembered that the opinion of the architects was invited on the subject some time ago, and an unfavorable response was given. The architects very properly considered the matter only as it involved their own interest, leaving the abstract view of it to another occasion, and being convinced that under the French law, which makes the architect and the contractor for any building jointly and severally responsible for its security for ten years after its completion, the admission of workmen's associations, which are commonly not only irresponsible but short-lived, to a position as contractors would end in throwing all the burden in such cases upon the architect, they protested against the scheme. Nevertheless, the idea seems to have taken a firm hold of the minds, not only of the Parisian workmen but of certain members of the government, and the experiment is at last to be tried. The workmen's companies have agreed that if in public contracts the government will make regular fortnightly or monthly payments on account, a reserve of twenty to thirty per cent of the value of the work done at the time of each payment may be kept back until the whole is completed, and the Administration of the Department of the Seine has accepted these terms, stipulating further, however, that a special fund shall be created in aid of those of the associated workmen who may fall ill or be wounded in the execution of the work, and for the widows and children of deceased members; that a board of arbitration shall be established to settle disputes between the members, and that one or more syndics shall be appointed from each association, who shall be legally authorized to act on its behalf, and shall draw up all tenders and superintend the work, subject to the direction of the Government architects and engineers. As an additional incentive to the workmen to maintain a high standard of efficiency and responsibility, it is provided that before placing any public work in the market a committee of eight members of the Municipal Council shall be appointed to determine whether the associations shall be admitted to compete for that particular contract, and their decision shall be without appeal.

An event so important in the history of industry as this promises to be should not pass without comment. No one can be blind to the innumerable dangers which threaten the existence of such associations, from dissensions and jealousy among the members, financial incapacity, and the mental helplessness which seems to have been developed among workmen by trades-unions. But the defects in the character of the average workingman which are likely to prove most harmful to the success of the new associations are the very ones which the novel responsibilities and cares involved in them will do most to cure. If they fail, as so many similar ones have failed before, the official recognition which they have received will give a dignity to their brief career which will be of value to their successors; and if they prosper, a long step in social reform will have been accomplished, and the succeeding ones will follow rapidly and easily. The development of the present associations out of the distress of the great strikes in France is as creditable to the workmen as the wise consideration with which they have been received is to the government, and we trust that the best anticipations of both sides may be amply fulfilled.

A new method of blasting is said to have come into use in certain English coal-mines, which might perhaps be applied to the quarrying of certain kinds of stone. The explosive, or rather, expansive agent used in the new process is quicklime, which, as every one knows, absorbs about twice its bulk of water, to form a dry powder of hydrate of lime. The energy of the expansion has never, so far as we know, been accurately measured, but it is probably very considerable, like that of most other changes of volume dependent upon chemical reaction, and the facility with which strong barrels are burst by the swelling of lime in them after exposure to dampness may have suggested the more scientific application of the force. After drilling into the beds of coal in the same manner as for blasting with gunpowder, finely powdered quicklime is poured into the holes, and the charge pressed down and tamped with sand as usual, with the difference that instead of a fuse passing through the middle of the tamping, a small tube is inserted, through which, when the charge is sufficiently packed, water is allowed to run slowly until the requisite quantity has been absorbed. The tube is then withdrawn, and its place closed; the lime continues to swell, and having no other way of escape, finally opens a seam in the rock. In underground mining, particularly for coal, such a mode of extraction has great and obvious advantages. Not only is the air relieved from the contamination of gunpowder or dynamite smoke, but the danger of setting fire to inflammable gases is averted, while the material loosened by the quiet expansion of the lime is in much better condition for handling and sale than when shattered and thrown about by a more violent shock.

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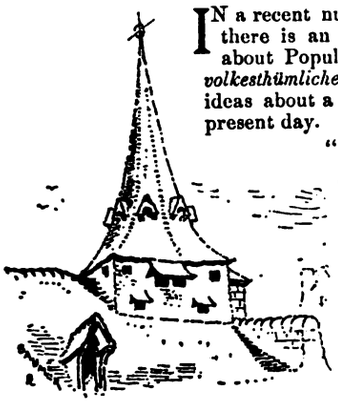
POPULAR ART.



IN a recent number of the Berlin *Gegenwart* there is an article called "Some Thoughts about Popular Art" (*Einige Gedanken über volksthümliche Kunst*) which is full of good ideas about a subject of vital interest at the present day. Quoting the distich of Goethe,

"Wonder-working pictures are mostly but miserable paintings,
Creations of mind and of wit do not for the people exist."

the author declares that the poet did not write the lines in the happiest mood, for, overlooking the objectionable vein of aristocratic exclusiveness which characterizes the poem, it is also vulnerable because of inner grounds and its untruth in the face of facts. An example of recent date is cited, showing how a certain picture worked wonders, and in return therefor became a favorite of the people, while, above all, it possessed high artistic merit. "Let the reader fancy himself for a moment on the scene of the Schützenfest at Munich last year, standing in front of the burg of the "Schützenliesl." The architect, Seitz, was in despair lest his buildings and decorations be not ready at the specified time: he called his friend Fritz Kaulbach to his aid, and in a period measured by hours, not days, the painter created that well-known Bavarian maiden with the beer mugs and the roguish look, whom no participator in the festival can soon forget, who is now making the round of the world in thousands of photographs, and who lately has even been modelled and cast in bronze—in short a popular picture in the widest sense, and at the same time a work of art worthy of its great master. And the wonder? Whoever is acquainted with Munich conditions will understand this too: a new, slightly known brewery, which tapped its beer under the ægis of the "Schützenliesl," became the most frequented on the grounds, and with its merry, enchanting picture established a reputation for which older competitors would have had to work for years. Is that no wonder, wonder-seeking folk? one might ask with Nathan.

"It will not be held as profanity for me to compare a tavern-sign, albeit made by the hand of one of the first of living masters, with the miracle-working pictures of saints with which Goethe's epigram has to do. I thought less of making this comparison than of making it clear by an example how a work of art becomes popular, that is, seen, understood, and at least for a certain time taken an interest in by the whole people. It is the festal joy, the exalted holiday mood turned away from all every-day cares, in which all visitors to the Theresa Meadow may have found themselves. Such a receptive mood is one of the main conditions, if not the only one, under which a work of art can become popular. The open mind of people diverted from the common interests of every-day life is the fertile ground upon which the seed of art falls at a fortunate moment, in order to grow up into beautiful luxuriant bloom, while thousands of seeds with the same vital capacity fall upon the hard path of every-day life and miserably perish.

"For art stands in irreconcilable contradiction to the business of the day. In every form in which it enters into our life, in order to be understood, appreciated and enjoyed, it demands that we turn away from the unrest of our struggle for existence, our ambition, and our every-day life. In the face of these enemies single branches of art are indeed armed with stronger weapons than others. Music, most of all, has the power to change our mood when we enter unprepared into her magic circle. Her might as consoler and releaser from care comes from the immediate effect of her waves of melody upon our souls, and because music creates a mood for herself, because she speaks to every heart with but little preparation, she is the most popular of all arts.

"The poetic art possesses a weapon no less good against the prose of every-day life, especially where she meets us in dramatic form. Melpomene does not visit us at home, where we may listen to her in dressing-gown and slippers: we must go to her. She demands choice toilettes; she receives us in the glittering theatre in unwonted and festal surroundings. This festal impression which a theatre interior makes upon us, the presence of hundreds of strangers, and the brilliant lights, snatches us out of the region of every-day thoughts, and translates us into that exalted mood which makes probable the fictions of the poet.

"Among the formative arts it is architecture which exercises the most influence upon the soul of man: only in her highest manifestations, to be sure, and when she is really an art expressed by a high artistic mind, and not a mere hand-work. The power through which she works is *space*. We are seldom conscious of this effect, but nevertheless few men are free from its influence. It is not the decoration, not even the coloring, but above all the impression of space combined with the effect of light that transforms our mood when we step out of the sunshine and the noise of a market-place into a Gothic cathedral. And how different is the mood within this cathedral, whose heaven-high vaults, bathed in dimness, lead to mystic dreamings, from the feeling given, for instance, by that most glorious of all interiors, the Pantheon at Rome. The simple, closed lines of the giant dome, combined with the clear unity of the light falling through the single opening in the zenith of the ceiling, have such an effect of eternal calm that all hurry and all misty thoughts leave us, and we feel more collected and receptive for everything good. An intellectual architect who knows how to deal with this mighty element of space will always be sure of its effect with the public, and that in the best sense it will be popular.

"The other formative arts have a much more difficult task when they undertake to present their works to us in the mood for which their creators designed them, and there is no other requisite for the understanding and enjoyment of a work of art. I can indeed think of finely organized persons of any calling, — not including fellow-artists, who can always best understand the work of their contemporaries, — persons who have the good fortune to devote their entire time and attention to the collection of pictures. One of those sympathetic connoisseurs, who in his still gallery places a favorite picture upon the easel and sits comfortably before it, and then by the hour loses himself in silent contemplation of the chords of color, of the rhythm of line, in the spiritual contents of the work, — of him it may be said that he enjoys the work of the artist in its fullest sense. But do these persons come into account when we speak of popular art? How do the people, including its cultured element, enjoy art? The well-conditioned man buys pictures because they belong to the furnishing of his rooms. If the wall is of a lively hue a picture painted in gray tones — a rainy landscape, a marine, or something of the sort — has the preference. This application of painting I would call industrial art in its full sense. But it is again only a small proportion of the public who have the fortune to ornament their rooms thus. The great majority of people see works of sculpture or painting only outside the house, be it in the decoration of public places and buildings, and last of all in museums. The first of these uses is that which most brings the mass of the public into personal relations with works of art; that is, makes them *popular*.

"Public monuments and monumental paintings on the outside of buildings, the latter formerly so common, and lately coming into play again to good purpose: these encounter us unavoidably. Be we ever so inattentive we must see them for once: they are always there and will, for good or for evil, find a place in our circle of view. Thus the man from the lower classes, who relatively passes much time upon the street, will imperceptibly come into relations with these works of art and gain a certain understanding of them. I believe that a great part of the art-interest which is undeniably a trait of the people of Munich is to be ascribed to the city's wealth of monumental works.

"But the museums now, — and what respectable middle-sized city does not plume itself upon a picture-gallery, — in what way do these official institutions of culture bring art nearer to the hearts of the people? It is a not uninteresting task, when wandering through an art-gallery, to make the visiting public an object of study instead of the exhibited art-treasures. If the number of visitors to most museums is to be taken as evidence, then art must be unprecedentedly popular to-day. But let us take a little closer look at the visitors who on a fine autumn Sunday afternoon are to be seen, for instance, in the new Pinakothek at Munich. We will leave out of account the 'shin-warmers' who seek comfortable quarters in the cool months, as well as those groups of frivolous young people of both sexes who avail themselves of the place as a rendezvous, and also the easily recognized disciples of art who form the most legitimate and appreciative element among the visitors to art collections, and who, from the creative artist down to the atelier attendant and the model, 'belong to the family.' The great mass remaining signifies in this case the people, with the consideration of whose art interest we are engaged. Look them in the eyes: observe them as they pass from one picture to another, and see how seldom there comes a gleam, a warm gaze, how seldom a minute's pause before a picture, even when it ranks among the 'jewels' of the gallery. There is one class of visitors, characterized by their thoroughly practical costume and their Baedekers as birds of passage, who, on their return flight from the south, stop over in Munich for a day, to renew their linen and study Munich art. The hurry and uneasiness of travel in their eyes leaves no room for the reflection of a real thought about art. But that train of young girls led from gallery to gallery under the oversight of two worthy matrons. Enthusiastic exclamations like 'charming! golden! very nice! beautiful!' heard continually from this lovely circle indicate an immediate effect of art upon these young maiden hearts? Be not deceived. For the most of them the museum is a picture-book whose leaves they are inquisitively turning: at best an illustration to the last lecture of their professor of art history. And if I am to choose, then I would give preference to the peasant family from Feldafing or Leermoos, who enter the door with shyness. Art may indeed fall upon their souls as something incomprehensible and overpowering, the splendor and height of the hall may have its share in their embarrassment, but at any rate art is operating upon beings who are neither *blasé* nor without thought, and who knows whether a kindling spark may not fall among these simple souls which awakens in the peasant lad a future Defregger.

"Now what is it that makes it so difficult for the great majority of our people, and among them the cultivated classes, to bring themselves into personal, warm-hearted relation to the paintings and

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plastic works surrounding them in our museums? These works cannot create a mood for themselves in the same measure as works of music: therefore they necessitate a certain mood in advance, and that these are so often, indeed in most cases, lacking among visitors to public collections is the fault of the people themselves. External circumstances are, to be sure, often to blame, — for instance, the manner of exhibition, which is often enough an object of complaint from fine-feeling natures, — but far more important than the mood which a work of art awakens under the most favorable circumstances is the mood which the spectator brings with him. In order to receive a 'striking' impression from a painting we must hear the sounding of a chord similar to that under whose influence the artist was prompted to create his work; but for that the strings of our soul must first of all be in tune, first of all capable of sounding.

"But how rare, if we will only be honorable, are the moments of our life in which we are sensitive to this mood! Rarest of all in those hours out of which the immeasurably greater part of our lives is built, those in which we are serving our calling, in which we are fighting the struggle for existence for us and ours, in which the wife, in the unchanging forms of family and social life, unlearns the perception of the flight of time. And while these weeks and months melt in the memory to a monotonous gray, those moments in which our soul was impressionable to that harmonious mood, and was stirred by the hand of an unaccustomed fate, gleam out of the picture of the past like clear lights in a landscape. The occasions may be endlessly different. In most instances it will be a joyous moment, — the tidings of a success; the early morning of a vacation journey after protracted work; the first walk out of doors after convalescence, when the sky seems bluer and the sunshine clearer than we have ever seen them before.

"And like individuals whole nations have such moments when their souls are opened. Indeed, in a degree, all festal occasions are nothing but utterances of that need to interrupt every-day monotony with moments of an exalted mood. And those times of world-historical crises in which embittered struggles of nations are decided; those times of breathless waiting in which murderous battles are fought; those days of victorious exultation; the return of friends from deepest dangers — we all remember that time when the popular soul was agitated to its deepest depths; how for a short time every-day cares sank in nothingness; how the mood of the entire people, North and South, was nothing but clear enthusiasm.

"And this is the soil in which art flourishes; and when a spark of enthusiasm glows through all classes of the people then the artistic expression which follows will be truly popular; for, let us contemplate art as we will, enthusiasm will always be inseparable from it, and be its fundamental condition. *Art is the language of enthusiasm.* So where a great event, or only a specially joyous occasion, kindles the popular soul to enthusiasm, there is the place where art with its creations comes close to the people, where it becomes popular. We can show instances of this from almost all political crises, or those of civilized history; and, indeed, can often cite the growing popularity of art as the symptom of such a heightened popular mood."

The author then brings forward examples of great art-awakenings in the past, for instance, "that creative time of wild storm and stress which broke the chains of the past and at the turn of the sixteenth century and in a spring-time breath of the intellect announced a new era — it created a new art whose incredibly rapid growth would vouch for its popularity even if we did not know, as at the time of the Renaissance, that the erection of monuments, the artistic decoration of the churches, the building of monumental council-halls and castles were the principal cares of all communities, republics as well as monarchical states."

Turning to the art of to-day the writer says that these examples of the close connection between popular enthusiasm and popular art are enough to prove that only that artistic utterance which is conjoined with an exalted mood in the soul of the people has a prospect of becoming really popular.

"The public plastic, the mania for monuments does not have the influence upon the artistic mind of the people in the measure that it could and should. We have seen that on account of its absolute publicity this form of Art might be the most popular. What is the reason that it is not? Almost always because of the false tendency of both artists and patrons, and which in short may be characterized as the result of superfluous erudition, or at least, of erudition falsely applied, above all the predominance of allegory. How do the most of our monuments look? The famous man, no matter whether in life he might have been under-sized, corpulent, or even somewhat malformed, stands in the figure of a Grecian demigod and in the costume of a Roman senator upon a pedestal that generally has a desperate resemblance to a chamber-stove. On the corner sit or stand three or four female figures in antique toilets, which are often very light, and they are characterized by the utensils which they hold in their hands as personifications of History, Patriotism, Horse-raising, Justice, Agriculture, Dramatic or Lyric Poetry, Bee-culture, and heaven knows what abstract meanings: these so-called allegories are what make such a work of art — and often a very deserving one — unpopular. The people want comprehensible representations and no abstractions; they see and judge the figure and not that which it may hold in the hand to make it recognizable. Therefore a great master, like Reinhold Begas with his Schiller monument in Berlin, can make even allegories comprehensible to the people when he represents the Muse of Tragedy as a powerful woman with a darkling look, and Lyric Poetry as a maiden with the charm of early, budding loveliness. But the most of this sort of figures which, without perceptible personification are only to be distinguished by the mask, the scales, or the oar which they hold in their hands, are unintelligible to the people, and are an old-fashioned relic of the Renaissance period. For at that time, especially in Italy, a knowledge of classic antiquity and even of the Latin language and literature was so universal that poet and painter could without scruple invite all Olympus together with the allegories of the Latin poets to become their guests."

In conclusion Herr Luthmer says that though Art in its being is a unity it has many forms of manifestation: "Several of these forms will always be enthroned on exalted heights; they will never descend to the people, and whoever attempts to thrust them down into every-day life will be found guilty of a sacrilege by finer minds, or if we would express it less solemnly, of a want of taste. Art, however, need not therefore be lacking in the daily surroundings of our life. It has fortunately produced a branch which is especially designed to beautify the household of the citizen: it is a thoroughly legitimate branch and a peer with its companions, which just now stands in the glory of luxuriant green and swelling buds, and which, it is to be hoped, will soon unfold into a wealth of blossoms; it is called *Industrial Art.* The time has gone by, heaven be praised, when artists themselves draw a severe distinction between art and art-industry; when the painter, whose lack of talent hemmed his step to higher endeavors, preferred privation rather than design initials and vignettes for books; when the architect who had no palaces to build held it an unworthy task to make furniture-designs for the cabinet-maker. That has all changed, and thanks to the joyful coöperation of the artists, industrial art has again developed into a worthy member of Art. It now seeks us out in the innermost rooms of our houses, bringing every utensil which we take in our hands, every piece of furniture upon which our eye falls, into the circle of the artistically beautiful; making art in fact popular. The exhibitions of the past year have given proof of the healthful influence now exerted upon our modern German art-handiwork. The Stuttgart exhibition in particular, and especially the yearly Christmas fairs of that city, have brought to light the surprising fact that peasant cabinet-makers bring from the villages of the Black Forest and the rugged Alb chests and tables at wonderfully cheap prices and in design and execution thoroughly in the spirit of the German Renaissance. It is a grand step forward, and an honor to our art-industry that the pleasure in the artistically beautiful and correct in style should have penetrated into the lower classes of the people, with producers as well as consumers, so that the art works not for the rich patron but for the most modest customer. In face of this fact we are justified in regarding the present movement not as a passing whim of fashion but as a mark of progress in culture resulting from the truest wants of the people." S. B.

FARM ARCHITECTURE.[1]

NEAR neighbors, perhaps only a field apart, the old homestead and the house of that one of the farmer's sons who has elected to follow in the paths trodden by his ancestors, may be seen in many parts of the older states, a most unpleasant contrast.

It is not only length of years, the picturesque processes of inevitable but carefully retarded decay, the growth of surrounding trees and shrubs, or the many associations that may be supposed to cluster about the older building that attract our attention and command our respect. What time, what landscape-gardening, what decay can ever make the newer building as interesting as the old? Can this modern telescopic house, each joint covered by a plain pitch-roof, the first declaring the parlor and the dining-room, the next the kitchen, the next the shed and men's rooms and the next the privy, each smaller and lower than the preceeding one, the whole structure with its two tall slim chimneys coming out one through each pitch of the main roof having the physiognomy of a jackass whose ears have abnormally developed and whose hind-quarters have gone sadly to seed, can this ever be interesting? It is difficult to conceive what law of evolution is responsible for these buildings: rational development clearly has nothing to do with their growth, and the most reasonable surmise that can be made is that some city carpenter used to long, narrow lots had some time moved into the country and in his first jobs did his best to repeat in wood what he had been used to seeing done in brick and stone, the different sizes and heights of the various sections being concessions to the owner's shallowness of pocket, or to his own conceptions of the picturesque. The exemplar built, it was at once sanctified, and repeated far and near with such

[1] *Farm Architecture: Houses and Barns.* A lecture delivered at the annual meeting of the Massachusetts State Board of Agriculture, 1880, by E. C. Gardner. Illustrated. Holyoke, Mass.: Clark W. Bryan & Co. 1882. Price, 15 cents.

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variation in the way of "dressings" and "trimmings" as the *modiste* of the jig-saw and the paint-brush could imagine.

The supersession of the open fireplace, which, though it caused strong draughts to play about the feet and called for high solid-backed settles before the fire, was an active agent in the preservation of health, by the "air-tight" stove was the result not of evolution but of revolution — a true going back, in principle if not in fact. The increase in the height of the story was, in view of this fact, a very sensible change, but would never have been a necessity under the original conditions, as has been proved to us by a five years' residence in a house whose rooms are only six feet eight in the clear, but in which, thanks to the open fireplaces and various cracks, the ventilation is always good. The dismissal of the open fireplace did away, too, with the substantial chimney-stack in the middle of the house, a generous mass of brickwork which stored up the heat during the day to gently radiate it through the night, so that of a morning there was not that deathly chill in the chambers that there is with the single-flue chimneys with walls only four inches thick, which have taken its place. The substantial filling of bricks on edge between the studs of the north and west walls, at least, has been given up for reasons of economy. The wide-spaced oak and chestnut beams and rafters, roughly wrought to be sure, but carefully jointed and pinned, have given place to a multitude of thin spruce timbers, the fuzz left on them by the gang-saw ever courting the chance spark or flame. It is difficult to discover in what the modern farm-house is superior to the old: the rooms contain perhaps a few cubic feet more of air, the windows sometimes are double-hung, the cellar is occasionally deeper, better lighted and ventilated, but this is all, and if such apostles as Mr. Gardner can persuade the members of agricultural societies to adopt the many good points of their fathers' buildings they will deserve well of the public and the posterity of the builders.

The change in the structure of the house is not more marked than the changes in the interior arrangement: the snug little staircase backing up against the central chimney-stack is replaced by a single straight run with meagre "banisters;" the kitchen, in spite of having become the chief room in the house, for here the family now cooks, eats, and for the most part sits when indoors, has lost that generous amplitude that accorded so well with the indications of the original open fireplace, where the tea-kettle and the baking-kettle hung side by side on the crane, and the still later Dutch oven, now wholly abandoned for the latest "nickel-plated" range, stood ready for the baking of the Thanksgiving feast; the cheery, sunny living or "keeping" room with its wooden shutters which gave excuse for the broad recessed window-seats, its wooden wainscot made of sheathing-boards so broad that no modern carpenter would think of using them, its cupboards in the chimney-breast and its broad open fireplace heaped up with white ashes in which large logs, which can hardly be had now-a-days at any price, smouldered day and night: all this has given place to the parlor, the sacred, rarely-invaded home of the nasal cabinet-organ and the vivid chromo of which Mr. Gardner says:

"But as the good old lady, protesting against the destruction of her favorite theological dogmas, declared she would never give up her 'total depravity,' so there are people who cling to their parlors as their sole title to respectability. They must have a room fifteen feet square, with darkened windows, a Brussels carpet, half-a-dozen hair-cloth chairs, a marble-topped black-walnut centre-table with horribly deformed legs, a 'spring-seat' sofa, a worsted rug with an abnormal dog on it, a 'whatnot' in one corner, and a bunch of dried grasses in the other, or the young ladies, poor things, cannot entertain their friends in good style, and the consequences will be fearful.

"Truly it is a serious question, one of the legitimate side-issues in a discussion of the planning of farm-houses; for our home-life does depend to a wonderful extent upon the character and plan of the house we live in. If, for instance, there is one large, cheerful sitting-room which contains all we have for general use in the way of comfort, beauty, luxury, — a room in which the best thought and the best work of the household finds daily exercise and expression, — it will soon be found that another room for any sort of company is a sheer waste of resources. On this great command hang all the law and the prophets of domestic architecture: our houses should be built to live in; not for show, not for company, not for fashion, but to furnish to the occupants the greatest amount of comfort and enjoyment all the time. Nothing should be so fine that it may not be seen and heard and enjoyed every day, nothing so poor and mean that we must hide it from our visitors. And it will follow, as the day the night, that the home which is most freely and largely enjoyed by its inmates will be the most delightful in the hospitality it affords to kindred and friends."

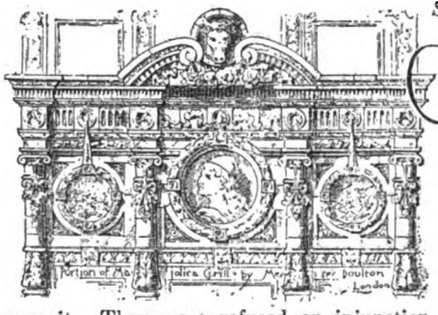
As to the character of the interior finish of these modern farm-houses, Mr. Gardner felicitously says that in designing them the thought was "spread too thin." In the old farm-house one does not expect to find the carved newel-posts and twisted balusters, the many panelled wainscot with delicate mouldings and even some sculptured panels, the enriched cornice of plaster or carved oak, or the exquisite mantelpiece that may often be found in the stately mansions of the period. But the same mechanics who built the houses of the wealthy built also the modest farm-houses, and as they were well-trained and loved their work, and as they were probably the designers of it they could not help seeing as the work progressed how a little extra labor here, a chamfer and stop on the ceiling-beam, another delicate moulding under the mantel-shelf, the breaking of a moulding round a window-frame or round a corner cupboard in the chimney-breast, would add to their own satisfaction in their work and the owner's pleasure afterwards. But such features do not appear in the new building: one or two machine-made mouldings do duty in every position, the composition door-knobs take the place of the cheerful brass thumb-latch, the plain and solid newel-post is replaced by an abomination held together by brad-nails and glue, the mantel-shelf is now a piece of marbleized slate supported on cast-iron brackets, the cheerful side-lights at either side of the front door, like the bull's-eyes in the upper panels, have given place to ground glass with incised patterns, and the brass or iron knocker has been banished by the gong-bell and plated crank-handle. These things are bad enough in themselves, for they most of them seem out of place in a farm-house; but when it is proposed to gut old-fashioned houses for the purpose of making such substitutions every lecturer should feel it his duty to subscribe to Mr. Gardner's protest.

"Old houses are sometimes subjected to another indignity, against which we cannot too strongly protest. The old finish is torn out and made into kindling-wood, and the queer old mouldings and flutings of the architraves, the bases, the wainscots and panellings, the chair-rails, ceiling-beams, and corner-posts ruthlessly demolished. It is vandalism to destroy these honest, homely features. By all means let them stand; cherish them, renovate them, paint them with the choicest colors, decorate them, carve them, drape them, build shelves about them, ingeniously contrive to make them so quaintly interesting and characteristic of your own particular home that the village neighbors who live in stylish, stuck-up houses shall grow green with envy when they behold them. Above all things don't commit the unspeakable folly of filling up, burying alive, the old fireplace. If it is too large for the modern wood-pile, line it with fresh bricks (moulded patterns cost but little more), and never make an apology for the high, stiff, old wooden mantel. Rather let us weep for our own stupidity if we cannot see and bring out the beauty it contains. The frequent superiority of these old members arises from the fact that they are the product of more thought and less machinery. The thought was not spread so thin. Hand and brain worked together then more than now."

RAMBLING SKETCHES.

MR. T. RAFFLES DAVISON, of the *British Architect*, has just commenced the issue of a series of plates under the name of "Rambling Sketches," similar in style to the delightful drawings with which the readers of that journal are already familiar. The work is to be completed in twelve monthly parts, each part to contain six plates, and the cost of subscription will probably be, on this side of the Atlantic, about ten dollars. We presume that all the drawings are to be the work of Mr. Davison, to whom the best of the *British Architect's* illustrations have long been due. If so, we can assure those of our readers who like masterly and beautiful sketches or desire to improve their own style by the study of the best models, that they will find enough pleasure and profit in the possession of the book to repay its cost many times over.

LEGAL NOTES AND CASES.



Street Railways.—Damages to Lot-Owners.

CERTAIN lot-owners made an application to restrain a street-railroad company from laying down its track in front of their lots, on the ground that they were entitled to compensation for such use of the street before the company could occupy it. They were refused an injunction and they appealed in the case, *Hodges vs. Baltimore Union R. R. Co.*, to the Maryland Court of Appeals, who in June, affirmed the action of the court below. Robinson, J., in the opinion, said: Whatever conflict, if any there be, in the decisions of the several states on this question, it is well settled that the legislature, in the exercise of its sovereign powers, may authorize the use of the streets of a city or town for such a purpose, and that such a use is not an additional servitude for which adjoining lot-owners are entitled to compensation. Cooley Const. Lim. 547, 560; 1 Redfield on Railw. 314, 326; *Elliott's case*, 32 Conn. 579; *Hinchman's case*, 2 C. J. Gr. 76; *West vs. Bancroft*, 32 Vt. 267; 21 Ill. 522. The right thus to use the streets of a city for a horse railway is not based, it is true, either upon the ground of public convenience or public necessity, because the legislature has no power to take the property of the citizen for a public use without just compensation. It rests, however, on the ground that such a use is neither inconsistent with nor does it in any manner supersede the ordinary uses for which the street was dedicated as a highway; that the easement thereby acquired was the right to use the streets of a city not only according to the then existing modes of travel and transportation, but all such other modes

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as may arise in the ordinary course of improvement; and that a horse railway is but one of the legitimate contingencies, within the object and purposes for which the street was dedicated to the public, and which we must therefore presume was within the contemplation of the parties at the time damages were assessed to abutting owners. 1 Redfield Railw. § 320; 2 Dillon on Mun. Corp. 719; *R. R. Co. vs. Leavenworth*, 1 Dill. 393; *Elliott vs. R. R. Co.*, 32 Conn. 579. We do not see on what grounds such a use can be said to be the imposition of an additional servitude. The motive power is the same, and the iron rails, although laid on the bed of the street, do not materially interfere with or obstruct other modes of travel and transportation. On the contrary, the railway in itself offers a quick and rapid transit from one part of the city to the other, thus affording greater advantages and facilities in the use of the street as a public highway. Nor is there any invasion of the legal rights of adjoining owners: their title to the land, subject to the public easement, remains the same, and they have the same access to their property and to the use of the street as a highway. The cars may, it is true, be an annoyance, but not greater perhaps than other modes of conveyance running at regular periods. But be this as it may, it must happen in the very nature of things that streets will be used for legitimate purposes, which may be to some extent an annoyance to persons living upon them, but this is an incident to all city property, and for which there is no legal remedy. Assuming, then, that the Act of 1882, authorizing the defendant corporation to construct a horse railway on certain streets in the city of Baltimore is a valid act, we are of opinion that the use of Park Avenue for this purpose is not such an invasion of the rights of the complainants as to entitle them to an injunction. H. E.

Fraudulent Sale. — Intention of Purchaser.

A purchaser of property from one whom it turns out was insolvent at the time of sale may testify that he made the purchase in good faith, and by such testimony his title may be maintained, in the opinion of the New York Court of Appeals, in *Starin vs. Kelly*, decided on March 22, 1882. H. E.

Assignment for Benefit of Creditors by One Partner.

One partner made an assignment of the firm property for the benefit of the creditors of the concern, and the other partner filed a bill in equity to set aside the deed of assignment. He was defeated, and on the appeal the deed was declared void, on the ground that one member of a firm cannot assign their property unless the other member or members are absent, or for some other reason cannot be communicated with. *Lieb vs. Pierpont*, Supreme Court of Iowa, June, 1882. H. E.

Value of Labor. — Prices as Evidence.

A brought an action against B for the value of his labor, and in proving his claim he offered in evidence the customary price paid for like services at the time and place where he had done his work, but he did not propose to show that these prices were actually paid under an express or implied contract. The offer was rejected, the court deciding that whilst the price paid for like labor at the same time and place could be proven to fix the value of work done, it must also be shown that these prices were actually paid as wages under contracts either express or implied. *Jenks vs. Knotts Silver Mining Company*, Supreme Court of Iowa, June, 1882. H. E.

Sales. — Goods in Bulk. — Delivery.

The title to goods sold which are part of like goods in bulk will not pass before the goods sold are separated from the mass by weighing, measuring, or counting them, in the opinion of the Supreme Court of Alabama, in *Mobile Savings Bank vs. Fry*, decided in May. H. E.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR A MERCHANTS' CLUB-HOUSE. MESSRS. J. A. & W. T. WILSON, ARCHITECTS, BALTIMORE, MD.

THIS design was submitted in the recent competition for the "Merchants' Club" of Baltimore. It was one of the three prize-designs selected by the committee, the authors of which were awarded equal prizes of $100 each. It was designed for execution in rough brick and Scotch sandstone, with tile roof, and was to have cost about $35,000.

TWO HOUSES ON THIRTY-SEVENTH STREET AND PARK AVENUE, NEW YORK, N. Y. MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

The material used in these houses is Philadelphia pressed brick and Connecticut brownstone, with terra-cotta panels in the gables.

GRASSHEAD HOUSE, SWAMPSCOTT, MASS. MR. ARTHUR LITTLE, ARCHITECT, BOSTON, MASS.

HOUSE OF A. STEINAU, ESQ., WALNUT HILLS, CINCINNATI, O. MR. W. W. FRANKLIN, ARCHITECT, CINCINNATI, O.

Architectural Lectures. — Mr. W. L. B. Janny has been appointed lecturer on Architecture by the University of Chicago. Weekly lectures are to be given on subjects of interest to all persons who may desire to build or occupy houses after they are built. The lectures are to be open to the public. The first lecture will be delivered in the latter part of September.

ROMAN TRACES ON THE RIVIERA.

THE sunny strip of coast-land which we Italian-wise call the Riviera, while the French call it the Littoral, highly favored as it has been by the hand of nature, has had but a sorry time of it at the hands of man. The blessings of constant floods of sunshine, and of a soil so fertile that it seems indifferent to drought, have not brought unmixed good to the original possessors. Century after century the good things thus showered upon them excited the cupidity of their neighbors, and they fell a prey to one invading horde after another. First within historical times we find the Romans, drawn by the goodness of the land, entering it as masters. This conquest brought nothing but advantage. The graces of civilization were added to heighten the original charms of nature. But when the country had become as thoroughly Romanized as Rome itself, it was trodden down by the barbarians, pillaged, ravaged, and reduced to ruin. Next the Saracens came swooping down on the coast, robbing churches and convents, where alone some traces of the better times still lingered, carrying off gangs of Christians into slavery, and finally perching themselves on the pointed insulated hills that offered such tempting sites, swooping down from these fastnesses ever and anon, like birds of prey, upon the valleys, and again so swiftly retreating with their plunder to the refuge of their lofty eyries that there was no time to think of a reprisal. And when at last these wasps' nests were taken, still the land suffered from the corsairs of the Mediterranean and from the quarrels of the neighboring princes, and was fought for over and over in most unenviable wise. Our own eccentric century has at last turned the tables. From being plundered the natives have now learned to plunder in their turn, only instead of making raids upon their neighbors, they have only to sit quietly at home while invading armies of simple strangers, with well-filled purses and open hands, of their own free will cast themselves for a prey into their teeth.

Very unmistakable traces of the Roman occupation have outlived all these social disturbances, and they are to be found in situations differing most widely in character. In the most fashionable quarter of a much frequented winter city one may see the remnants of an amphitheatre encircling the villas which desecrate its arena. Or again, in the depth of some secluded valley, only accessible by a footpath, and miles from any haunt of man, suddenly there crop up through the pine trees the lofty piers and crumbling arches of one of the great aqueducts, by means of which the Romans pressed the mountain streams into the service of the seaports. The line of the great road, the Via Aurelia, that led from Rome to Arles has unfortunately been lost, so that it is impossible to identify positively any now existing towns as the stations upon that road. For some reason or other the sites that seemed good in the eyes of the Romans are not approved of by modern eyes. Nice and its companion Cimies form a notable exception to this rule. Antibes, the port of Neptune, that was called Antipolis because it was built over against Nice, has not been so lucky. Though still used as a garrison on account of its fortifications, it is but a poor dirty place, that all modern improvements, railway station included, seem to keep as far away from as they can. But nearly every town, village, or dilapidated château, which is left stranded in its native dirt on its peculiar hilltop while the tide of renovation passes it unheeded, has some relics to show proving that it once was honored with Roman occupation. These are of the most varied kind. They may be the foundation of a tower, or a wall, or stumpy bits of columns, or an ancient sarcophagus used as a well-trough, or a votive tablet with an illegible inscription, or perhaps only a few scraps of pipes or pottery. All these treasures combined are to be met with at Vence, the ancient "Vocontium." Vence is one of those places that have gone down in the world while its neighbors have been rising. After Nice, it was the most important Roman station in the district. It was very early the seat of a bishopric, and has a peculiar patron saint — a Roman, too, as the sarcophagus in which he was buried, still to be seen under the altar in the Cathedral, very plainly shows. And at Vence may be seen two ancient columns with Latin inscriptions, brought in very early days from Marseilles; but the fate of the pair is a striking instance of the caprice of fortune, for while one stands erect, topped with a capital, in the square outside the church, the other has been used to prop up the pent-house of the public washing-trough. Here and there in the streets are scraps of carving and inscriptions, and a quantity of more or less broken stonework, in the form of miliary stones, votive slabs, and altars, fragments of mutilated figures and pillars, all huddled together in a little

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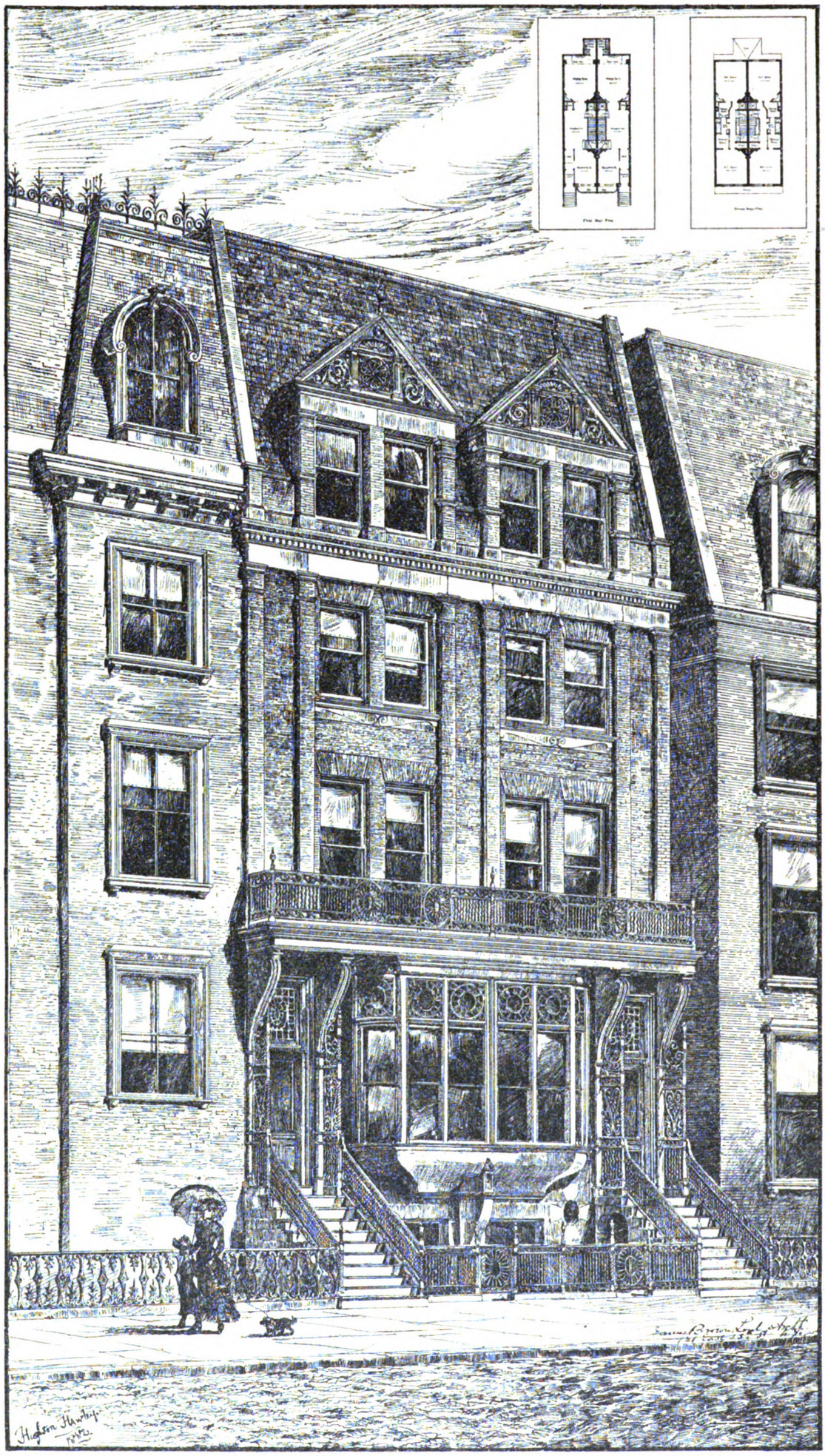

Two Houses built on 31ft = At 37th St and Park Ave N.Y. for = Howard Potter Esq. James Brown Lord: Architect.

The Heliotype Printing Co. 211 Devonshire St. Boston.

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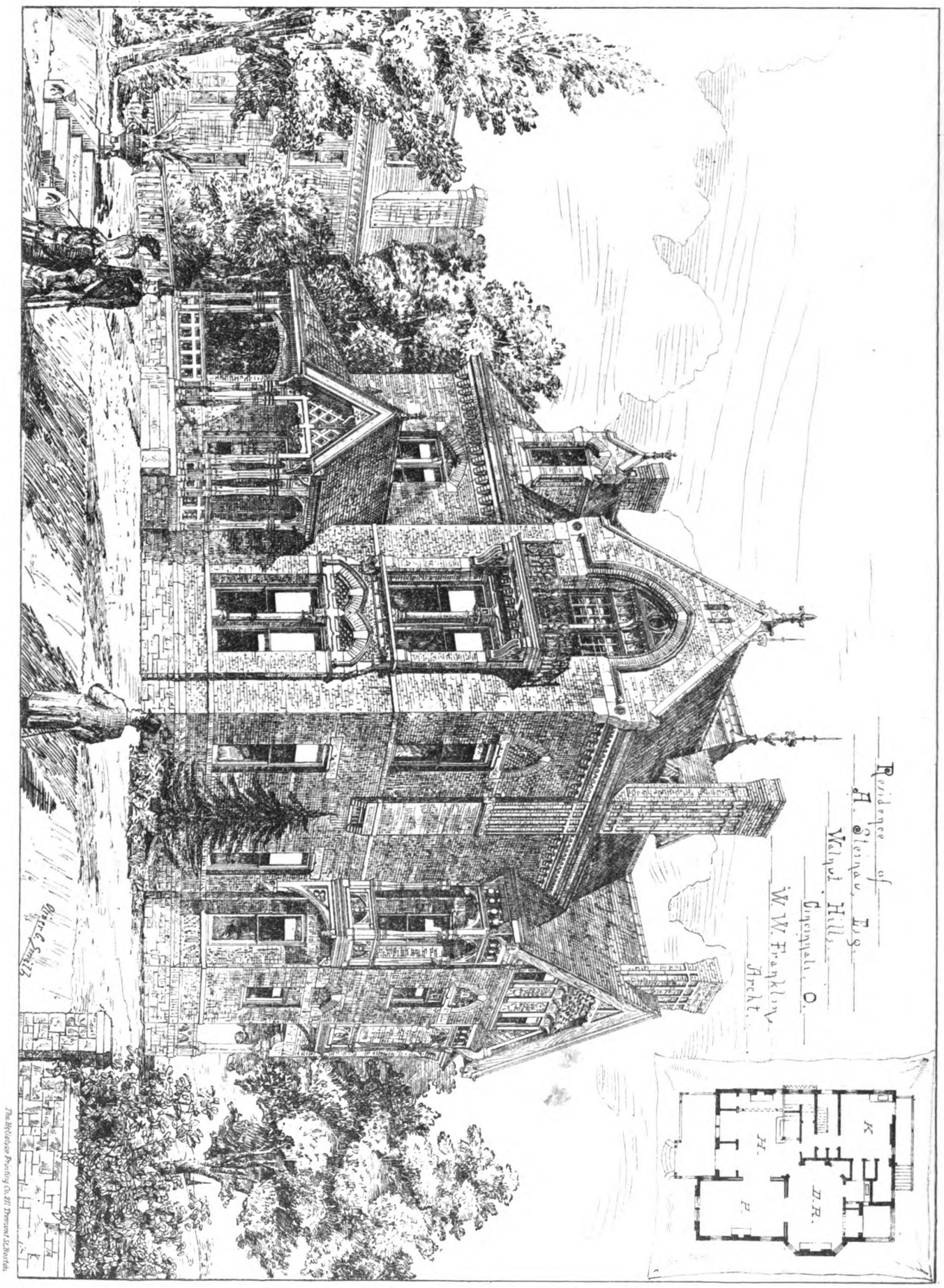

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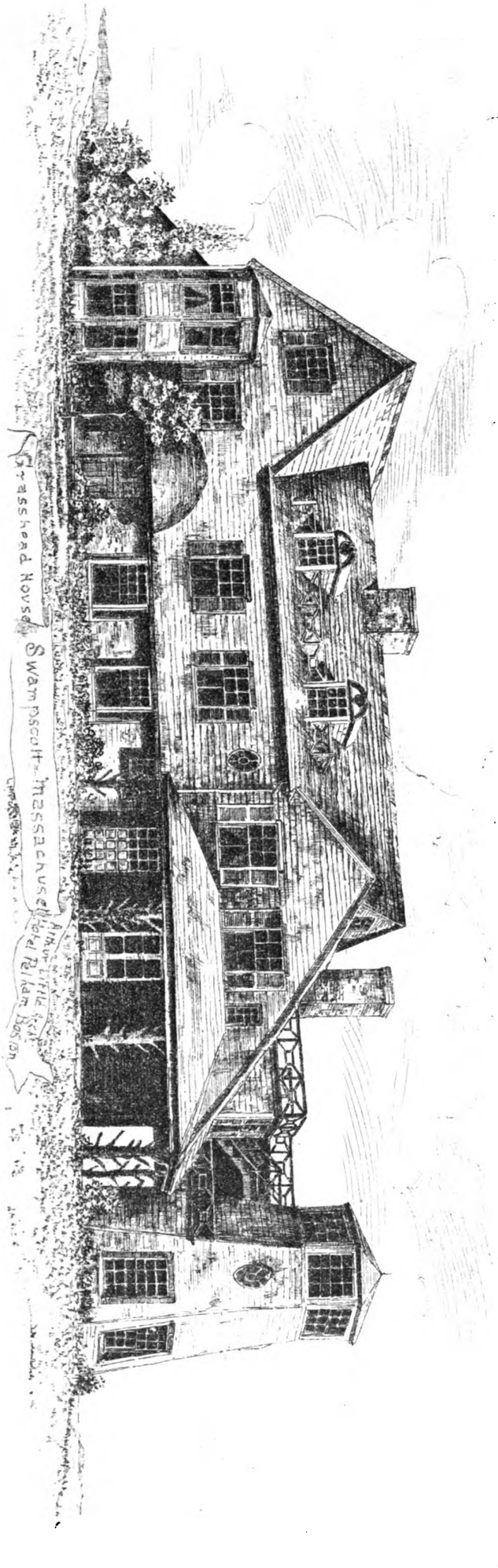

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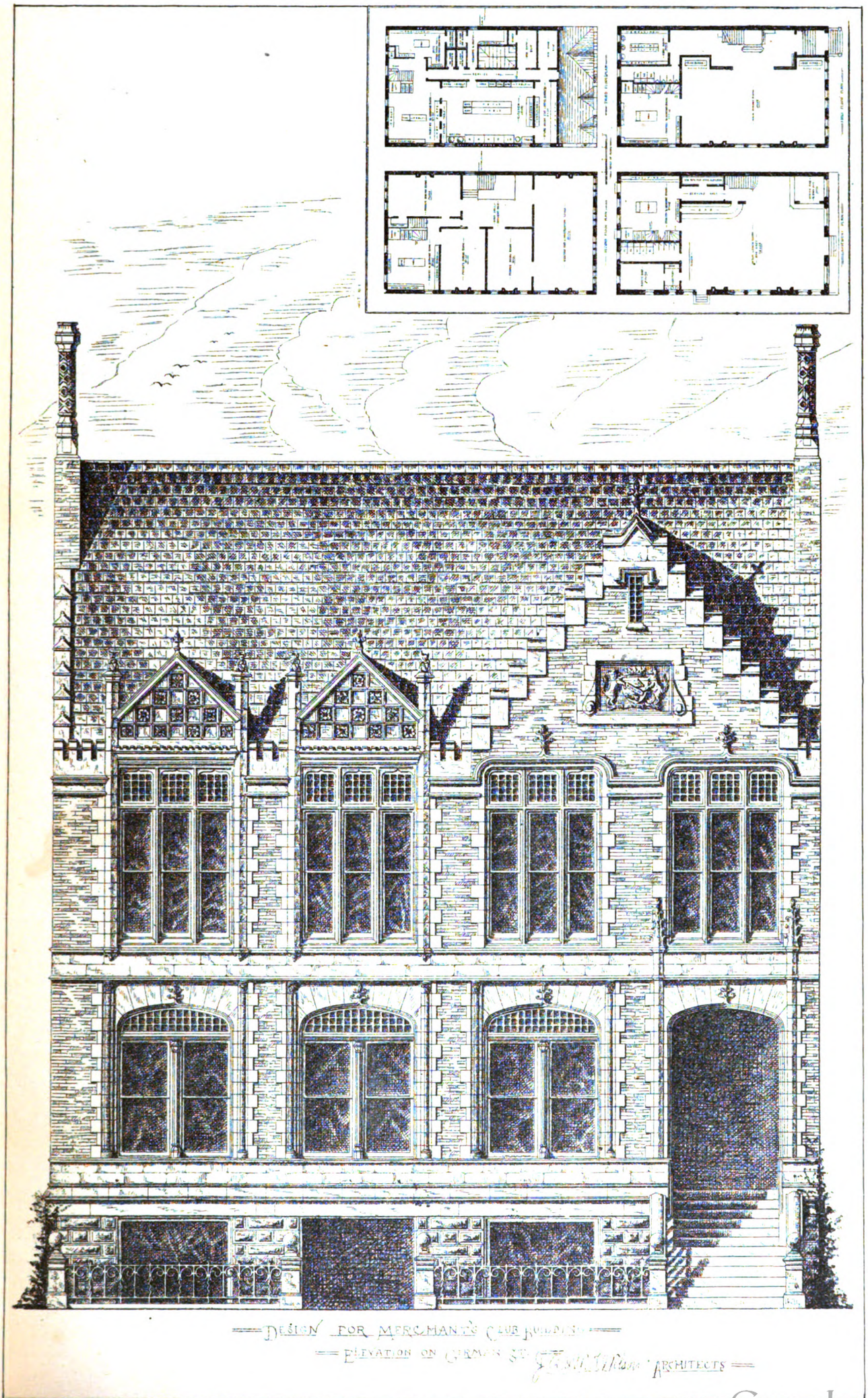

DESIGN FOR MERCHANTS' CLUB BUILDING.
ELEVATION ON GRAMERCY PARK. GEORGE B. POST, ARCHITECT.

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courtyard, to be reached in such a roundabout way that the stranger may seek for it in vain unless he fall in with some good-natured townsman willing to act as his guide.

In the middle ages the glory of Vence was its cathedral, and its bishop was a person of importance. With the union of the see to that of Grasse under Godeau that glory departed; but the cathedral still stands, and is a very interesting "monument," as the French delight to call any building that is larger than its fellows. Tradition says that a Pagan temple to Mars and Cybele was replaced by the Christian church some time towards the end of the fourth or beginning of the fifth century, and that on the foundations of that the present church now stands. The greater part of the cathedral in its existing shape is not older than the thirteenth century, though the columns are probably of much older date. The characteristic features of the building are that it has five naves, and that the choir, instead of being in the usual place, is exalted on a gallery at the west end. It is fitted up with handsome carved wooden stalls, fifty-one in number, said to date from the reign of Louis XI. At a little distance from the town there is a "Calvary"— that is to say, a rocky path leading up a steep ascent to a chapel at the top. All along this path the "Stations of the Cross" are represented by groups of figures, life-size, roughly hewn out in wood and gaudily colored and absurdly clothed. Until quite lately an old priest, known as the "père gardien," lived in a ruinous tenement hard by and took care of the Calvary, and was credited with saying the due amount of masses and services in the chapel. But now he is dead, no one has taken his place, and no one seems to care how soon the Calvary tumbles to decay.

Vence lies half-way between Grasse and Nice. In old times, when one went to Nice by posting from Grenoble, as it lay on the high road, it must have been one of the customary halting-places, and doubtless saw many strangers pass that way. Now, however, it is left quite deserted, both by road and railroad, for the line follows the coast, and Vence lies many miles inland at the base of the mountains. The station for it is at Cagnes, a town near the sea, but no carriages are to be had there beyond an omnibus of a very mean type, and as the road runs up hill nearly the whole way the drive is a very long and a very weary one. Travellers who dread such an ordeal would do well to go by carriage from Grasse. The excursion there and back can be easily done in a day. The drive from Grasse is very pretty and interesting, passing the wild gorge of the "Saut du Loup" and the peak-perched Saracen holds of Gourdon and Les Tourettes, the latter with its rock foundations quite concealed by the wild luxuriance of aloes, recalling the memory of the children of the desert who first founded it.

Also within a day's reach of Grasse, but lying westward, is the so-called "barrage" of the Siagne. This is the beginning of the great aqueduct, which may still be traced, now by perfect arches, now by piers more or less entire, almost everywhere by at least their stumps, many kilometres across country to Fréjus. This city was a great place in its day. It would take a lively imagination to see any likeness between the names Fréjus and Friuli, yet they are identical, both being the modern forms of Forum Julii, the name the Romans gave to these two widely distant emporiums. The Mediterranean Forum Julii was a seaport with a harbor, so large that Octavius moored his whole fleet there after the battle of Actium. The harbor is now filled up with silted soil, and covered with vineyards and oliveyards. Beyond these lies the sea, which is now nothing more to the old town than a broad band of blue in the distance. Some three miles off on its edge lies St. Raphael, now aspiring to a place among winter stations. But the many Roman traces of Fréjus deserve to be treated of at greater length, and we must now notice one of the grandest of the landmarks left on this coast.

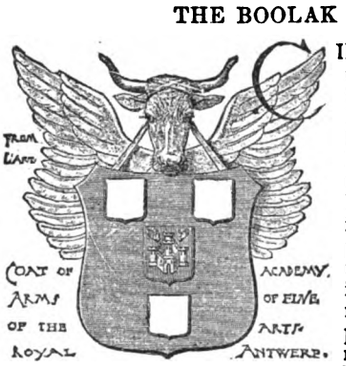
Another station has now been added to the many stopping-places on the line of rail that winds along the coast from Marseilles to Genoa. This new halting point lies between Eza and Monaco, and is dubbed Turbia-sur-Mer. It thus makes it easy to reach a new spot in this much-sought-after region, and doubtless another season will see the usual eruption of villas displacing the olive-trees in its near neighborhood. At present, however, the use of the station is to bring supplies within easier reach of the fortifications which the French have just completed on the Testa da Cane, the hill that overlooks Monaco at the height of one thousand metres above the sea. Sixteen kilometres of excellent road have been made to connect the fortress and the station. The name Turbia has been borrowed from the little town that lies high up the mountain in a fold of its eastern side. Quaint as are all the hill towns of this region, Turbia surpasses them all. The streets are lined with arcades, supported by the pointed arch instead of the round form almost invariable hereabouts. The high driving road from Nice to Mentone passes through Turbia, but it may be reached on foot by a path which climbs the mountain side among the olive trees from Monaco.

The Turbia itself, the tower which has given its name to the pass, the town, and the new station, is an imposing ruin occupying a position five hundred and twenty-two metres above the sea-level, conspicuous alike from sea and land, and commanding the whole line of the coast from Nice to Ventimiglia. Archæologists are much divided as to the origin of the name and the original purpose of the ruin. Some trace in it the hands of the Phœnicians, and maintain that it was a temple to their god Melkarth, for whose worship just such an elevated site was always chosen. They suppose the temple to have been the seat of a famous oracle, which was only effectually silenced by St. Honorat, as related by the Provençal poet Raymond Férand in his metrical life of the Saint: hence, they contend, the Provençal name "Turris Beata," now cut down into "Turbia." The most probable theory, however, certainly is that Turbia is a corruption of "Tropæa," and that we see in this anomalous ruined mass the remains of the "Tropæa," or Trophy of Augustus, erected by the Senate on a summit of the Alps to perpetuate the memory of his entire subjugation of the Gauls. The advocates of the Melkarth theory suggest that the temple already standing was utilized for this purpose by the Romans to save themselves the trouble of constructing a new tower. However that may be, the ruins as they now stand certainly bear the stamp of Roman energy, though they have suffered the usual mutilation and additions consequent on being used as a fortress in the middle ages. Originally the lower part of the tower must have been an open arcade composed of thirteen pilasters, or masses of solid masonry, composed of huge blocks of stones laid one upon the other without mortar. It is singular that the spaces between these pilasters, instead of being arched after the Roman manner, are bridged over by a horizontal level entablature of large blocks of the same form placed edgewise. The spaces between the pillars are filled in with rubble and masonry, evidently of a much later date. This makes it difficult to make out the original design. The top is now surmounted by a tower with mediæval battlements of the fourteenth century, and buttresses of masonry, evidently designed to strengthen the building, have been added to it at the sides. It seems most probable, however, that it was originally simply a round monument, the lowest story of which was surrounded by an open gallery or portico. Tradition points to the Turbia as the quarry from which marble columns and sculptures were taken for the decoration of churches and palaces in Genoa, Monaco, and Nice. A colossal statue of Augustus is said to have been placed on the top, and it is supposed that it was surrounded by statues of his victorious generals. In 1583 the Père Boyer asserts that he found here a colossal head of Augustus, but, if he did, all trace of it has been lost. But in the end of the last century a mutilated head, supposed to belong to a statue of Drusus, was found here. It is now in the Museum at Copenhagen.

La Torre de gran bastiment,
Au payras de gran cayradura.
E obras d'antiqua figura
Colonnas de marmes pesanz —

are the words in which Raymond Férand describes it in the thirteenth century, and though the marble columns and the towering statue have long since disappeared, the "pierres de grande carrière" are still to be seen in this, the most striking of all the Roman remains of the Riviera. — *The Saturday Review.*

THE BOOLAK MUSEUM.



CIRCULATION is given to the rumor that, in order to replenish his empty treasury, Arabi Pasha proposes to sell the Boolak Museum, and has ordered Professor Maspero to value that priceless collection of Egyptian antiquities. Though it is difficult to see how the purchaser of this piece of national property could convey it out of the country, there is nothing improbable in the report; and considering the imminent peril in which the life-labor of Mariette Bey and his successor is placed, perhaps Arabi could scarcely perform a kindlier office to his unfortunate native land than to dispose of the tombs and treasures of the Pharaohs to custodians more reverential than the illiterate rabble of Cairo. For weeks past Egyptologists have trembled lest the one great attraction of the City of the Mamelukes should have fallen a prey to the cupidity of the Arabs or to their blind rage for destruction. The European staff of the Museum are reported to have left, the Director, Professor Maspero, only remaining to guard the storehouse, on which he sets such value. His steamer was, at the date of our last intelligence, anchored in front of the building, ready to escape with some of the lighter or more inestimable objects, though the Europeans in Alexandria justly considered that at any moment he might pay for his fidelity with his life. With a few exceptions none of the Egyptian officials were capable of appreciating the importance of this noble collection of objects illustrating the history of the Nile Valley.

The museum owes its conception to the late Mariette Bey, the eminent French antiquary, whose enthusiasm first roused in the minds of the Viceroys some interest in the colossal monuments of their predecessors; his successor, Signor Maspero, is an Italian, and his coadjutor and deputy, Brugsch Bey, is of German origin. But though English scholars — among others Dr. Birch, Mr. Villiers Stuart, Sir Erasmus Wilson, Mr. Pool, and Miss Edwards — have, like the students of every country, drawn much of their information from the material freely thrown open to the world, to France is due the principal credit of the Boolak Museum. France, Empire and Republic, always encouraged the directors, and the School of Ar-

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chæology stationed in Cairo did much to keep alive an interest in Egyptology, just as the similar institution in Athens has for so many years trained a series of students in the principles of classical antiquity.

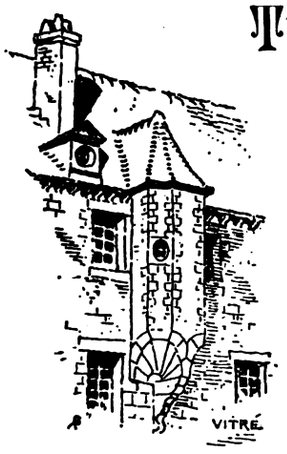
When Auguste Mariette, the self-taught scholar, first came to Egypt, he found that for ages the soil had been ransacked for treasures, or for "curiosities," without any one deeming the subject worthy of a moment's consideration. This trade is still going on, but to Mariette Bey must be accorded the honor of entirely stopping it in one direction and of rendering it difficult in another.

Ismaïl Pasha, who spent other men's money with such lordly lavishness, converted the unwearied archæologist into Mariette Bey, "Director of the Department for the Preservation of the Antiquities of Egypt," and granted him an annual subsidy for the prosecution of his investigations. What was more, he built the Boolak Museum, and — when he had not a foreign magnate to dazzle with his magnificence, or a vice-regal marriage to celebrate with a pomp which made the bondholders wince — supported it with a liberality which caused the heart of M. le Directeur to leap with joy. Never was "the endowment of research" attended with results so admirable. Cairo speedily began to possess attractions for *literati* as well as for painters, idlers, and invalids. The fine Khedivial Library, rich in Korans and the fragments of early Egyptian manuscripts which had escaped the despoiler, grew under the hands of its German "bibliothekar" into a collection of fame, while the Boolak Museum, at the bidding of Mariette and his assistants, became what it is — the orderly synopsis of Egyptian history.

No one who has only gazed in bewilderment at the "Egyptian antiquities" in European museums can conceive what Boolak became under Mariette and Maspero. The student who has gone through Wilkinson, Vyse, Champollion, and Quatremere, will learn from the "Musée Boulaq" how little he knew before. The spirit of the place is a stimulus in itself. The endless rows of kings and queens, their canopies of state, their gods and their domestic animals, their slaves and their children, their jewels and their wills, their correspondence, — sometimes unopened when death came, and unread for three thousand years, — everything that ministered to their pride, their pleasures, or their superstition — all are here, and every day was adding to the splendid collection.

A laudable despotism was exercised to prevent any more of the treasures of ancient Egypt being sent out of the country. When, twelve months ago, an unwonted plethora of royal "properties" began to arouse the suspicion of Professor Maspero that a fresh discovery had been made, he it was who ordered the authorities to arrest one of the brothers Abd-er-Rasoul and imprison him until he revealed the secret of the vast subterranean tombs among the cliffs of Thebes, where lay in solemn grandeur, in imperishable flesh, the goodly company of kings, queens, princes, and priests of the royal blood now in the Boolak Museum. What is lost we can only imagine from what remains. The Harris and the Abbott papyri were doubtless only two of the thousands in the temples of Memphis and Heliopolis from which Manetho, the priest of Ptolemy Soter and Philadelphis, compiled that vanished history of ancient Egypt so often quoted by Eusebius and Josephus. Even yet there is a vast hoard to be unearthed when civilization is once more permitted to roll back the dark cloud of ignorance. But until Western intelligence is again allowed free sway in Egypt, every specimen garnered in Boolak is only so much of Ptolemaic history put in peril. — *London Standard.*

MR. BURGES'S ADVICE TO A YOUNG ARCHITECT.



THE following letter was prepared by the late Mr. William Burges at the desire of a young architect who consulted him about the worthiest course to follow in the study and practice of architecture:

My Dear Sir, — I venture to submit the following considerations to your notice: —

You have passed your apprenticeship, done your Academy, and finished the usual Continental tour, and the question now arises as to what you are going to do.

If you follow the usual course you would take an office, hunt up work, and do the same, according to your lights, consoling yourself that many other architects would do it much worse.

Of course there are various sorts of practice, all of which are open to you, and you might become simply a house doctor, or a warehouse architect, or a light-and-air man, or an architectural policeman (*i. e.*, a district surveyor), or a general practitioner: and it is quite possible to make *money* by any of these, the amount depending on the extent of the practice, and that again upon the number of friends, besides the amount of the importunity and impudence by which work may be solicited.

But reflect; are any of these men artists? It is true that when they die they may have made money, but what else will they leave to the world beside that? Their names are simply written in water.

Now it is quite open to you to take to all or any of these lines of practice, to make money, to bring up a family, to become churchwarden, and, above all, to be pronounced "warm" when you leave this world.

My object in writing these lines is to suggest to you that there is another course open to you by which you may perhaps be the means of leaving some beautiful things to posterity, and by which your name may possibly survive after you have quitted this life.

The question then arises, why not try to be an artist, an accomplished man, a creator of works of art, and an ornament to your profession?

You have not the excuse that many have for not making the attempt, as I understand you are in a great measure independent of your profession.

Why not use that advantage to be something more than an idler on the one hand or a money-grubber on the other?

Try at least for a couple of years. They will not be lost years, even should you eventually not take up the artistic branch of your profession; for you will to a certain degree have educated yourself in the attempt, and you will be so much the better.

Supposing you decide to try, let us see where you are. You know something of modern construction, enough to enable you to practise without letting your buildings fall. You can draw well, and in an architectural and geometrical manner; but I know nothing of your perspectives, and your free-hand drawing is woolly, and wants precision. Above all, you are very defective in the human figure. (You have, I presume, a fair knowledge of the history of architecture.)

Now I should recommend you to employ your next two years in three principal things:

1. The drawing of the human figure: this is really the foundation of all good taste. I don't mean that you should spend weeks in frizzling up a figure in chalk, for you are not going to be a painter, but that you should learn to draw correctly and know the bones and muscles which go to make up the outline, and, in fact, to be able to account for everything you see.

2. A serious course of reading of the best and most well-known authors. This also will conduce to form your taste. Philosophy and science will not help you so much as works of the imagination. Bohn's Library furnishes fair translations of the best writers at 5*s.* per volume; but if the work is a translation it is desirable to get two or more versions and to compare them together. In the classics I should recommend Homer, Aristophanes, Æschylus, Herodotus, Xenophon, Virgil, Horace, Apuleius. Of the moderns, Dante, Chaucer, Shakespeare, "Faust," "Robinson Crusoe," "Undine," and Lane's translation of the "Arabian Nights." Of course I could mention many more, but these are sufficient for the present.

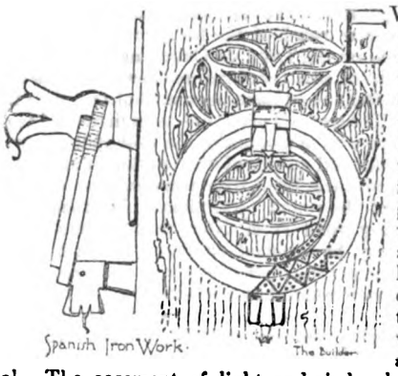
3. To carefully study and draw various beautiful things; and whether the said thing be a piece of jewelry or a piece of iron-work, or a building or portion of a building, — to do it thoroughly, to find out its construction and why this and that is done, the basis of the ornamentation, the particular form of the curves, and never to leave it until you know all about it. The result will be that the next time you see a similar thing you will know all about it and won't want to study it again. Do everything by common sense; don't make a drawing when you can make a rubbing, and regard all your drawing in the light of evidence which is worth next to nothing if it is not authentic.

I consider you very lucky that you have such an opportunity of having your "learning" time over again, and I am quite sure that if you make up your mind to be industrious, your two years spent in the way I have ventured to suggest will be very happy as well as very useful ones.

Hoping you are not bored by the above,

I remain, yours truly, W. Burges.

LIGHT AND AIR.



EVEN in our largest cities we very seldom hear of suits being brought to prevent encroachment on the light and air privileges which have been enjoyed by older buildings from the time of their erection, but it seems likely that as time goes on these privileges will be more highly valued, and that owners and their lawyers will turn for precedent and leading cases to the English law reports, where they will find abundant but conflicting material. The easement of light and air has long been a most important question in London, and during the past year the Council of the Institute of British Architects has collected a mass of information on the subject from the members of the architectural and legal professions best fitted to give trustworthy opinions. These opinions are published in the last issue of the *Proceedings*, (No. 18. 1881–

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1882) and it would perhaps be well for our architects to endeavor to obtain copies of it and file it away for possible future need. Upon the subject matter of the investigation the *Building News* says:

The daily encroachment of new buildings on the areas and vacant spaces over which light and air can pass to existing houses is already a serious trouble for freeholders and occupants of houses, not only in the city, but in the suburbs. A freeholder builds a row of houses at a considerable expenditure on a plot of ground, open behind or in front; it faces, probably, a large field or meadow, or a piece of waste ground. The houses are all let to respectable tenants; but no sooner do the tenants get comfortable in them, than another row of houses is built parallel to it within a few feet of the back garden-wall, darkening the windows, and rendering the back rooms almost uninhabitable; or the vacant land in front may be taken by the speculative builder, and forthwith houses of three or four stories are built, blocking out the light and obstructing the prospect. If it so happens that the first-built houses have small windows in the lower stories, the effect of the obstruction becomes a serious matter, and the houses suffer from a constant succession of tenants. We might point to several localities where the want of light has had a prejudicial effect in the letting of properties. It is a legal maxim that the strict right of property entitles the owner to so much light and air only as falls perpendicularly on his land; but it will be at once seen that if this legal right were the only means of obtaining it in thickly-populated towns, there would, practically, be only the light which falls upon the roof of a house, or, at most, upon the small area of ground to each house in its rear. It so happens that every house depends chiefly for its light in a lateral direction, or the passage of light and air over adjoining lands. It has, however, no right, legally, to such lateral lighting, and it is perfectly optional for the owners of the adjoining land to build up close whenever they are so disposed, within a certain prescribed period of twenty years. Beyond this time, as our readers are aware, a right to light and air is established, and becomes an easement, so that after the lapse of this time no building can be put up to interfere with the light and air which, during that period, have flowed uninterruptedly through the windows of the older building. All this is well known by those who have attempted to build near old houses; but there are no restrictions, unfortunately, in the case of houses built within the time laid down by the Prescription Act, such as we find in all lately-built neighborhoods, so that within twenty years it is competent for each party to build close to his neighbor's land, and block out any windows he may have in the side walls of his house, or so materially darken them as to render the rooms useless without artificial light. In the recently-heard and important case of Gardner *vs.* Whitely, [reported recently in the *Building News*, p. 59, ante,] and which the judge took time to consider, we have an instance of the difficulty of deciding upon the merits of such a case as we have hinted. The plaintiff was the freeholder of an entire terrace of large private houses known as Porchester Gardens. Parallel to this block in the rear, and at a distance of 50 feet, the defendant erected lately an enormous range of dormitories for his assistants, fronting the Queen's road. These erections had the considerable depth of 250 feet, and rose to a height of 50 feet above the roadway. The plaintiff's representatives considered this prodigious dormitory building had interfered with the light and air of the terrace houses. On the defendant's side it was contended that he had kept well within his legal rights. The witnesses called on each side were numerous, and included many architects and surveyors of experience. It was alleged by the witnesses for the plaintiff that depreciation was caused to the extent of £3,000, while those on the other side considered there was no substantial damage done. This instance is one out of many of the conflicting opinions still held by judges and surveyors on the right to light. The right, in the majority of instances, has either never been acquired, or there may have been some circumstances which have operated to nullify the legal right. The light may have been shown, for instance, to have been obstructed so as to produce an interruption of its enjoyment, and there may be an acquiescence in the obstruction. It is a question for a judge or jury whether there has in such cases been a submission to or acquiescence in the interruption. It has been established at law that a valid interruption so as to prevent the acquisition of the statutory right must be submitted to for one year after the party interrupted shall have had notice thereof, and must be an actual discontinuance of the enjoyment by reason of an obstruction so acquiesced in. Such a case as this often occurs. A is the owner of a house which has the right to light, but many years before he took possession the owner of servient tenement granted to the tenant of the house leave to make certain windows at a certain rent for a given period. After its expiration no fresh agreement was entered into, but the rent continued to be paid. A new owner of the servient tenement erects a building so as to obscure A's light. It is clear, however, that the servient owner cannot show evidence of an interruption.

A number of instances are to be found where a substantial deprivation of light has been suffered without any apparent legal redress. It is, for example, easy to darken substantially the windows of a house by a lofty building just opposite to it, or in the rear, so long as no right has been claimed; and even where there has been an enjoyment of light for the statutory term, it must be proved that the light was enjoyed during the first and last year. It is not difficult sometimes to bring evidence to prove an abandonment of the right during that period, and, after all, the actual circumstances which are presented to a jury often baffle the legal principles, and have to be weighed well by the evidence submitted. The constant erection of lofty buildings behind a row of houses, and within a few feet of the back windows, is one which calls for a more stringent remedy than the law of light can afford. The full enjoyment of the right cannot always be established, or there may have been some interruption of the right, or acquiescence in the obstruction.

As the efficient lighting of houses depends so much on the lateral direction of the passage of light, and as there is always a number of tenants who suffer from erections with dominant rights, the great importance of determining the distances between houses and the areas of land behind rows of houses, cannot be urged with too much force. The Metropolitan Building Act provides open spaces of an area totally inadequate to secure sufficient light to dwelling-houses, especially in the rear. These areas ought to have been regulated by the height of the buildings, and there ought to be something like a proportionate relation existing between the heights of buildings and their vacant ground. It may appear almost Utopian to formulate now any principle in the respect of the areas between houses in the thicker parts of the metropolis; but in the suburbs there ought to be restrictions imposed which will prevent building owners from covering vacant areas near adjoining property to so great an extent as to deprive the tenants of the essential elements of life and health. The present evil of over-crowding, which is growing to such an alarming extent in all the metropolitan suburbs, is due to the greed of land-owners and the short lease-hold system; but it is in the power of our municipal and sanitary authorities to impose regulations which may give to the tenants some security that their light and air shall at least not be unnecessarily interfered with or lessened, and that they may be enabled to take a lease for a few years in the suburbs without the fear or risk of being surrounded by lofty factories or workshops close to their windows.

THE FOLK-LORE OF ARCHITECTURE.[1]

THERE are many folk-tales which refer to the mysterious removal of buildings, generally churches, from the sites originally intended for them. Thus there is the story as to Wrexham Church, which would have been built at Bryn-y-ffynnon but for the energetic objections of the fairies, who undid in the night that which the builders had done in the day. At last a watch was set, and though nothing was seen, there was heard the voice of one crying in the wilderness "Bryn-y-grog." On hearing this the owner of some land at the spot thus indicated who had been previously unwilling to sell, expressed his readiness to allow the site to be used for the erection of the church. The interposition of supernatural agency to decide the precise site of such buildings is a feature common to many folk-tales. Sometimes when the builders had selected the top of a hill stones were removed to the valley. At others, when the human worshippers desired to be in the sheltered vale, the invisible but active spirits of the air decided that it would be more conducive to piety if they had to ascend a mighty hill. At Denbigh, where Robert Dudley, the favorite of good Queen Bess, began to build on a magnificent scale, the displeasure, we are told, was caused by the vanity and ostentation which impelled him to church-building, and the ruins of his intended structure still serve to point a moral and adorn a tale. If, however, the vanity and ostentation of the founder is to ruin a church, what will be the future of ecclesiastical architecture? Some of the variants of the story are curious. Many attempts, we are told, were made to build a church at Godrefarth, near Llandewi, but the walls fell down as soon as they were built until the present site was selected. Two oxen were employed to bring the stones from the Voelallt rock. One of them died, and the other made great lamentation for his dead comrade, and then lowed three times, after which the rock was shattered, and there was no further difficulty in obtaining stones for the building of the tower. Various agencies were employed to execute the wishes of the mysterious powers. Thus at Breedon, in Leicestershire, the materials were removed by "doves;" at Winwyck, by a pig; at Leyland, by a cat.[2]

[1] By William E. A. Axon, F. R. S. L., in the *British Architect*.

[2] The church of West Walton, near Wisbech, has a detached tower standing close by the churchyard gate. Of course there is a legendary reason for its present position. When that old church was new the Fenmen made themselves notorious by their special ingenuity in sin, and the Evil One hired "a number of people" to carry the tower away. It is not of course stated why the Devil took special offence at the tower, nor what manner of people they were whom he hired. Apparently they were not of his own household, but sons of the children of men. Probably in this, as in some other matters, he found human cheaper than diabolical labor would have been. He did not show much wisdom in the selection of his instruments, for the "number of people," after getting the tower on their shoulders — a feat that would astonish even a Chicago contractor — were balked by the churchyard wall. They could not get the tower over the wall, and as the gate was not wide enough they finally, after running all round the conse-

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When St. Patrick was building the great church at Cashel, the work of the day was undone in the night. St. Patrick watched and saw a great bull — an Irish one, of course — with fire-flashing nostrils busily engaged in knocking down the stones of the rising church. He set one of his converts to work, and the next time the bull was "on the rampage," Oisin dropped from a rock on to its back, placed a hand on each horn, tore it asunder, and dashed one of the sides so hard against the wall that the impress was left on the wall hardened into stone.

In the parish of Tolleshunt Knights, in Essex, there is an uncultivated field, and at some distance from it an old manor house known as Barn Hall. The legend is that the hall was intended to have been built on the first-named spot, but the Devil destroyed in the night-time all that had been done in the day. A knight, with two dogs, were set to watch, and when the Evil One came there was a sharp tussle, but of course Apollyon was vanquished by Greatheart. The irritated demon thereupon snatched a beam from the building and hurled it through the darkness, exclaiming —

"Wheresoe'er this beam shall fall,
There shall stand Barn Hall."

The Devil further declared that on the good knight's death he would have him, whether he were buried in church or out of it. To avoid the penal fires thus threatened, the valiant warrior was buried in the wall, half in and half out. In the latter circumstance we seem to have a distorted reminiscence of the older custom of sacrificing human life in order to propitiate the spirits of earth and air. It is not without possible relation to this that we find Mr. A. Boughton-Leigh giving an account of a curious discovery of the remains of human bodies underneath the walls of a church.

A QUESTION OF PROFESSIONAL PRACTICE.

August 4, 1882.

To the Editors of the American Architect: —

Dear Sirs,—I have read your paper with much interest and profit, far beyond what I expected, but building for myself stimulated inquiry and thirst for knowledge in that direction. I wish to propound to you a question, or make a statement of the naked facts, for your conclusion whether I was right or wrong, or who was, if any one.

I am building a residence for myself, my own home, on one of the avenues of this city, costing about $7,000 or $8,000 when finished.

I employed an architect to draught plans and specifications, which he did; the plan suits me; I pay him two per cent of contract price simply for the draught of plans. There his duty, to a certain extent, ends. By that I mean he does not superintend or take charge in any sense, or give any directions, and is not paid for it. I superintend myself in connection with the contractors; the architect signs certificate on estimates to the contractors.

The contract excepts mantels, shelf-hardware, plumbing, glass, back plastering and cornices, — all the rest it includes, taking in painting with three coats, inside and out. The contract contains a clause that *no extras* or changes shall be had "except as agreed upon by myself and contractor, *before* the specific change is made or work commences." The house is almost ready to enter, save some painting, and all has gone smoothly up to the present.

In regard to the painting, which the contractors are to furnish: they sub-let the painting to an honest, well-meaning, hard-working firm, but totally devoid of any taste or artistic talent in combination or harmony of colors. That is acknowledged and admitted. I consulted the builders, contractors, architect, and fifty other persons who had built, and examined fifty houses, and still my wife and I were confused as to the right kind and number of colors to put on the outside. Finally I consulted a young man, an artist, a decorator by profession, known and employed as such by the city, by societies, by everybody and anybody who wants anything handsome and perfect: the only real successful artist in that line in the city. He is also an architect by profession, but makes more money by consultations and suggestions for outside and inside decorations than by the draughting of plans, although some of the handsomest houses in the city already built and in process of erection are according to his plans as architect; but before he went into business for himself he was chief draughtsman in the office of another architect in the city, and while there he draughted the plans of nearly all the handsome houses which bear the name of the old architect. That is proper, natural, and usual. The old architect is the one under whose supervision my plan was drawn, but it was actually done in outline and detail by the young architect and decorator in his capacity as subordinate, and in that capacity only I consulted him, while he was in that office. Now, while my plan and house is progressing, the young man leaves the old architect and goes it alone in the world and at once plunges into a good business, his decorating and artistic talent putting him in the front rank immediately; but I consult the old architect when necessary and let the young one do the best he can or take no notice of him. But as there are no disputed points the architect has little to do, as I personally superintend and decide as to the quality, kind and color, and way of having things which are not "*clearly* set forth" in the contract or which are *not there at all. Now*, when we came to paint or decorate the outside I consulted my wife, the old architect, builders and everybody I could that had an idea. We were not suited, or could not decide. Finally my wife suggested that we consult the young decorator or artist professionally, especially as it was his idea of outline and detail that entered into our house: so I consulted him, took him up there — in five minutes he decided what colors to use, how many and where they should go, took a sheet of paper, draughted a section of the house, put on the colors, which I handed to the painter, and hence we have one of the handsomest looking houses in the city and admired by everybody. So far, so good. Now, the inside, — the contract called for three coats of paint, subject to change, of course, if I pay for it. The contractors were to put in first-class clear stuff inside, — they did not do it. We wanted it oiled or pellucidite, but the stuff would not bear it after giving one coat by contract at extra expense of my own. We came back to the original proposition, to paint as per contract; but as before nobody suggested just the thing, so I go again to the decorator and drive him up, have him examine and ask advice. He solves the difficulty at a glance and his suggestion is adopted and is pleasing to me and to everybody. And now a clerk in the office of the old architect, and by his authority, comes up to-day and forbids me as owner, or the painter, from carrying out any suggestion of the decorator or young architect, on the ground "he is interfering." Now I am the one at fault, if any one.

Now will you please tell me who is right and who is wrong, and have I no right to have my house painted by the advice of any one I please, and must I be balked because of some old feeling of which I know nothing about and take no part in, between the old architect and the young architect? Yours respectfully, *

[The question here seems to be whether the owner of a building has the right to break off his connection with an architect at pleasure and employ another. To this there is only one reply to make: that he is unquestionably entitled to do so, provided he does not infringe upon the rights of the first architect. These rights are, — to perform the work for which he was engaged, and to receive pay for it; and to enjoy such advantages as the reputation of having completed it would afford him; and if he is dismissed without fault on his part he is entitled to full payment for the services which he was engaged to render, and would have rendered if his client had not prevented him, as well as to compensation for any damage caused to his professional reputation by his abrupt dismissal. If the owner is willing to assume this responsibility, which is evidently fair to both parties, he is under no other obligation to protract his connection with an architect against his inclination. — Eds. American Architect.]

NOTES AND CLIPPINGS.

Change Ringing. — Change ringing is more of a curiosity in mechanic arts than art of music. A band of English bell-ringers visited this country in the year 1850, and rang the peal of Christ Church on June 9th, under the direction of Mr. Henry W. Haley, who managed to ring 5,040 changes in three hours and fifteen minutes, with consummate skill, and being the first or probably the only change ringing in the United States of America up to this time, was duly appreciated by many attentive listeners. Celebrated bell-ringers amuse themselves with the rule of permutation, to find how many changes can be rung on a given number of bells, and what time it takes to ring each number. The bells to ring about 90 strokes per minute in continued succession, without melody. The product of the number of bells and number of changes gives the total number of strokes. (See table.) — *John W. Nystrom, in the Journal of the Franklin Institute.*

Table for Change Ringing.

Number of bells.	Number of changes that can be rung.	Time required to ring the changes.
2	2	Two seconds.
3	6	Twelve seconds.
4	24	One minute.
5	120	Five minutes.
6	720	Half an hour.
7	5,040	Three hours and a half.
8	40,320	One day and four hours.
9	362,880	Ten days and twelve hours.
10	3,628,800	Fifteen weeks.
11	39,916,800	3 years and 60 days.
12	479,001,600	37 years and 355 days.
13	6,228,020,800	500 years.
14	87,178,291,200	7,000 years.

Wind-mills — For the early history of wind-mills and a description of European wind-mills, Fairbairn's "Mills and Mill Work" may be consulted to advantage. For a description of the details of American wind-mills see article on Wind-mills in Appleton's Cyclopædia of Mechanics, 1880. For an account of experiments on wind-mills see Smeaton's "Miscellaneous Papers," and Coulomb's "Théorie des Machines Simples." For the best angles of impulse and "weather" for wind-mill blades see *Engineering and Mining Journal*, October 7, 1876, and Appendix I of this note. The question of the impulse of wind upon wind-mill blades involves, too, the consideration of the relation between the velocity and pressure of the wind. A concise summary of this question, useful to no small extent in its reference to the journals containing the original publications of those who have given the subject attention, will be found in a paper by Mr. F. Collingwood, C. E., read before the American Society of Civil Engineers, April 6, 1881, on "An Examination into the Method of determining Wind-Pressures." In Appendix II of this note will be found the tabulated result of the writer's own work in this connection, in which the effect of temperature has received its due consideration. In the *Journal of the Scottish Meteorological Society*, 1880, Mr. F. Stevenson describes some interesting experiments, tending to show the effect of the height of observation above the ground on the relative velocity and pressure of wind. (See also *Engineering*, January 14, 1881.) — *Journal of the Franklin Institute.*

crated circle, "revoked," and dropped the offensive structure close by the entrance. It is impossible not to feel that somewhat hard measure was meted out to the demon on this, as on some other occasions. The "number of people" were clearly liable to an action for breach of contract, and their only method of escape would have been the pusillanimous one of pleading that the bargain was void on the ground of its intrinsic immorality. Some towers are, however, so offensively ugly that such a plea would be no valid defence — at least to a jury of taste.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

262,199. HOT-AIR HOUSE-HEATING FURNACE. — A. Penrose Benner, Philadelphia, Pa.

262,219. LATCH. — John Gérard, New Britain, Conn.

262,220. SASH-CORD FASTENER. — William Goforth, Windsor, Mo.

262,233. CLAMP. — Andrew Kraiss, New Milford, O.

262,238. VENTILATOR. — Thomas Minchin, Chicago, Ill.

262,243. LATCH. — Emery Parker, New Britain, Conn.

262,263. — PIPE-WRENCH. — Caleb C. Walworth, Boston, Mass.

262,276. METHOD OF COATING WALLS WITH FLOCK. — J. H. Campbell, New York, N. Y.

262,290. HYDRAULIC ELEVATOR. — Arthur Granville, New York, N. Y.

262,291. ELEVATOR. — Hiram Graves, Syracuse, N. Y.

262,295. URINAL. — James P. Hyde, New York, N. Y.

262,297. FIRE-ESCAPE. — Hugh Keenan, Worcester, Mass.

262,310. WASTE-PIPE COUPLING. — Louis B. Ohliger, Canton, O.

262,319. SHUTTER-FASTENER. — Eduard Ritz and Adolph Gärtner, Jersey City, N. J.

262,337. FIRE-ESCAPE. — Hattie D. Wilson, New York, N. Y.

262,341. SAW-HANDLE. — Emanuel Andrews, Williamsport, Pa.

262,343. MORTAR AND PLASTER. — William Arrouquier and Thomas Barrett, Worcester, Mass.

262,344. SPIKE. — William H. Bailey, Minneapolis, Minn.

262,348. ADJUSTABLE REAMER. — George A. Bates, Hartford, Conn.

262,356. FIRE-PROOF SHUTTER. — Cornelius Berrian, Clinton, Iowa.

262,360. FLUE-FAN. — Donald M. Bliss, Westmoreland Point, New Brunswick, Can.

262,367. WINDOW. — Marshall B. Burk, Dayton, Wash.

262,397. LOCK FOR SLIDING-DOORS. — Edward A. Gauchet, Fair Haven, Conn.

262,398. CURTAIN-FIXTURE. — Paul E. Gérard, New York, N. Y.

262,399. INSIDE WINDOW-BLIND. — Alexander C. Gibson and William W. Gibson, Toronto, Ontario, Can.

262,400. SPRING-HINGE. — William Gilfillan, New Haven, Conn.

262,415. FIRE-PROOF BUILDING. — Philip G. Hubert, New York, N. Y.

262,475. METALLIC ROOFING SHINGLE. — Ephraim M. Repp, New Windsor, Md.

262,483-484. FIRE-PROOF BUILDING. — John J. Schillinger, New York, N. Y.

262,490. DOOR-ALARM. — Charles A. Smith, St. Louis, Mo.

262,508. ROOF-SEAT FOR SHINGLING. — William P. Thomson, Joliet, Ill.

262,518. WATER-CLOSET. — Thomas H. Walker, Kansas City, Mo.

262,531. WATER-CLOSET ATTACHMENT. — Henry Barron and Herbert Raimes, Kilburn, County of Middlesex, Eng.

262,549. TRAP FOR WATER-WASTE DETECTORS. — William E. Worthen, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

CHAPEL. — Mr. Wm. H. Marriott is building, after designs submitted by himself, a chapel for the North Ave. Baptist congregation. The building is located at the cor. of North Ave. and St. Paul St., and is 54′ x 63′, exclusive of a bay, and an annex, containing baptistery and dressing-rooms; materials, stone and marble; seating capacity, from 400 to 500; cost, $13,000.

CHURCH. — Mr. Chas. L. Carson, architect, has completed drawings for the "Faith Presbyterian Church," to be located at the cor. of Broadway and Biddle St., to be 83′ x 104′, Gothic in style, built of bluestone with sandstone finish, and have seating capacity for six hundred; cost, about $40,000.

BUILDING PERMITS. — Chas. E. Willis, 12 three-st'y brick buildings, Presstman St., between Mount St. and Vincent Alley.

F. O. Cole, four-st'y brick warehouse, n w cor Saratoga St. and Bradenbaugh Alley.

Albert Mahone, 10 three-st'y brick buildings, Mount St., beginning at n e cor, of Mosher St.; also 5 three-st'y brick buildings, Mosher St., between Mount St. and Vincent Alley; also, 4 two-st'y brick buildings, Vincent Alley, n of Mosher St.

W. E. Clements, three-st'y brick building, Harmony Lane, between Schroeder and Poppleton Sts.

Wm. H. Hostetter, 2 two-st'y brick buildings, Ann St., between Gay and Biddle Sts.

Joseph Scherer, four-st'y brick building, Broadway, between Canton and Eastern Aves.

John T. Groener, two-st'y brick building, in rear of Sterrett St., between McHenry and Ramsey Sts.

E. W. Haviland, 24 two-st'y brick buildings, Vincent Alley, between Tennant St. and Patterson Ave.

Jas. R. Eaton, two-st'y brick building, in rear of Eden St., between Monument and McElderry Sts.

John Parsons, two-st'y brick stable, in rear of Pennsylvania Ave., s of Baker St.

H. Oatmiller, two-st'y brick stable, Arch St., between Lexington and Saratoga Sts.

Fred. Aschmeier, two-st'y brick building, in rear of Light St., between West and Ostend Sts.

John Weitzel, 4 two-st'y brick buildings, s e cor. McElderry St. and Madeira Alley.

Martin Joeckel, 2 three-st'y brick buildings, s w cor. Sharp and Hill Sts.

Geo. J. Hooper, 3 two-st'y brick buildings, McElderry St., w of Choptauk St.

Boston.

BUILDING PERMITS. — *Brick. — Village St., No.* 33, Ward 16, for Thomas M. Stevens, four-st'y family hotel, 50′ x 52′; Stephen Moxon, builder.

Village St., No. 35, Ward 16, for Nathaniel M. Jewell, four-st'y family hotel, 50′ x 52′; Stephen Moxon, builder.

Dartmouth St., cor. Harwich St., Ward 11, for Reformed Episcopal Church Society, church, 42′ and 48′ x 77′; D. Sullivan & Son, builders.

South St., Nos. 206–216, cor. Kneeland St., Ward 12, for John Casey heirs, four-st'y dwell. and stores, 11′ 2″ x 65′; Hobart S. Hussey, builder.

South St., Nos. 202–206, Ward 12, for John Casey heirs, four-st'y dwell. and stores, 20′ x 34′; Hobart S. Hussey, builder.

Norman St., Nos. 11–13, Ward 7, for Mrs. Calvin G. Page, four-st'y tenement, 36′ and 37′ x 47′.

Wood. — Thorndike St., No. 76, Ward 21, for Geo. B. Faunce, two-st'y dwell., 24′ x 37′; Henry C. Allen, builder.

Medford St., rear, nearly opposite North Mead St., Ward 4, for H. Wood's Son & Co., storage merchandise, 40′ x 42′ 4″; Ira Hammond, builder.

Walnut Ave., rear, near Monroe St., Ward 21, for W. S. Robinson, two-st'y stable, 20′ x 22′; W. S. Robinson, builder.

Warren St., near Unnamed Pl., Ward 21, for Reuben Green, 2 two-st'y and mansard dwells., 14′ and 22′ x 49′; H. C. Allen, builder.

East Seventh St., Nos. 567 *and* 569, rear of, Ward 14, for J. N. Goodenough, wagon-shed, 22′ x 46′; Otis R. Downes, builder.

Newbeck St., off Bennington St., Ward 1, for Ellen Donovan, dwell., 17′ x 25′; Thomas Allen, builder.

Washington St., rear of, near Keyes St., Ward 23, for M. D. Ross, dye house, 40′ x 48′; Charles Lewis, builder.

Dorchester St., near East Ninth St., Ward 15, for Wm. Peard, store, 20′ x 30′; Wm. Peard, builder.

West Sixth St., near D St., Ward 13, for James Hughes, three-st'y dwell., 22′ 4″ x 36′ 4″; James Walsh, builder.

Brighton Ave., near Allston St., Ward 25, for Chas. A. Sabine, two-st'y dwell., 29′ x 34′; Chas. A. Sabine, builder.

Bodwell Park, near Bird St., Ward 20, for John J. Merrill, two-st'y dwell., 30′ x 41′; Alton G. Read, builder.

Northern Ave., opposite Dock No. 1, Ward 13, two-st'y saloon and store, 25′ x 40′; McGaragle & Co., builders.

Gaston St., near Warren St., Ward 21, for Osgood Fifield, two-st'y mansard dwell., 26′ and 28′ x 34′ 6″; Osgood Fifield, builder.

Nixon Ave., near Sharp St., Ward 24, for Wm. Paul, two-st'y dwell., 22′ x 29′; Wm. Carlile, builder.

Dudley St., No. 288, near Winslow St., Ward 20, for James P. Ingols, two-st'y dwell., 21′ 6″ x 30′ Henry E. Locke, builder.

Border St., No. 277, for Thos. Mooney, two-st'y dwell. and store, 18′ x 26′; Sampson & Coffin, builders.

Maple St., rear of, near Wayne St., Ward 21, for Wm. D. Forbes, stable, 40′ x 70′; McNeil Bros., builders.

Brooklyn.

BUILDING PERMITS. — *Berkeley Pl.*, s s, 209′ e Seventh Ave., 2 three-st'y brownstone dwells.; cost, each, $8,500; owner, architect and builder, John Magilligan, 56 Berkeley Pl.

Jefferson St., n s, 195′ w Tompkins Ave., 6 three-st'y brownstone dwells.; cost each, about $4,000; owner, architect and builder, Wm. Taylor, 83 Third Pl.

Throop Ave., n w cor. Floyd St., three-st'y frame tenement; cost, $6,000; owner, John Donger, Throop Ave.; architect, William Maske.

Herkimer St., s s, 100′ e New York Ave., two-st'y brick dwell.; cost, $3,200; owner, Mrs. Mary Kroger; builder, G. H. Kroger.

Hall St., e s, 180′ s Flushing Ave., three-st'y brick factory; cost, $7,000; owner, Mrs. Everts, 91 Clinton Ave.; architect and Carpenter, Thomas Hanlon; mason, C. Collins.

Reid Ave., n e cor. Green Ave., three-st'y brownstone dwell.; cost, $14,000; owner, George F. Smith, De Kalb Ave., cor. Reid Ave.; architect, R. B. Eastman; builders, G. Cutler and W. Doughty.

Smith St., No. 230, w s, 60′ s Butler St., 2 four-st'y brick stores and tenements; total cost, $13,000; owner, D. Buckley, Smith St., cor. Butler St.; architect, F. E. Lockwood; builders, T. J. Nash and J. J. Geraghty.

Kent St., Nos. 104 *and* 106, s s, 150′ e Franklin St., 2 four-st'y brick tenements; cost, about $15,000; owner and builder, James R. Sparrow, 105 Kent St.; architect, Frederick Weber.

North Third St., No. 52, s s, 150′ from First St., one-st'y brick factory; cost, $3,500; owner and architect, Christian Wasel, 50 North Third St.; builders, Jenkins & Gillies.

Eckford St., Nos. 289 *and* 291, w s, 100′ n Calyer St., 2 three-st'y frame tenements; total cost, $8,500; owners, John Hafner, 139 Franklin St., and C. Simell, 585 Lorimer St.; architect, J. Hafner; builders, T. & J. Van Ripern and S. Randall.

De Kalb Ave., s s, 250′ e Central Ave., two-st'y frame dwell.; cost, $2,400; owner, August Almy, 1336 De Kalb Ave.; builders, E. Loerch and J. Rueger.

Fulton St., s s, 75′ w Ralph Ave., 4 three-st'y frame stores and dwells.; owner, Ellex. Kanner; architect, T. F. Thomas; carpenter, Charles Holmer.

Graham Ave., Nos. 50 *and* 52, e s, 25′ n Cook St., 2 three-st'y brick stores and tenements; total cost, $13,000; owner, John Grill, 52 Graham Ave.; architect, J. Platte; builders, J. Auer and F. Hatte.

Ewen St., e s, 50′ s Meserole St., four-st'y brick store and dwell.; cost, $7,300; owner, Charles Eisner; builders, U. Maurer, Jr., and J. Rueger.

Livingston St., Nos. 107 *and* 108, three-st'y office; cost, $22,000; owners, Association for Improving Condition of Poor; architects, Parfitt Bros.

Van Brunt St., n e cor. Walcott St., rear, three-st'y brick dwell.; cost, $2,800; owner, J. McAffery, on premises; architect, J. J. Kelly; builders, P. Kelly & Son.

Jefferson St., s s, 72′ e Nostrand Ave., one-st'y brick chapel; cost, $3,600; owners, Church of the Reconciliation, 146 Monroe St.; architect, H. G. Brush; builder, W. H. Burhaus.

Leonard St., e s, 125′ s Nassau Ave., three-st'y frame tenement; cost, $4,500; owner, Andrew Bond, Leonard St.; architect, F. Weber; builders, A. V. Cannon and Cauldwell & Hawkins.

Commercial St., on wharf, two-st'y brick boilerhouse; cost, $7,500; owner, Havemeyer Sugar Refining Co.; architect, H. C. Havemeyer; builder, J. B. Woodruff.

Henry St., w s, 20′ s President St., 4 four-st'y brownstone flats; cost, each, $8,000; owner and builder, E. L. Donnellon, President St., near Henry St.; architect, R. Dixon.

Sixth and Seventh Sts., Seventh and Eighth Aves., 2 two and three st'y brick pavilions; cost, each, about $50,000; owner, Seney Hospital; architect, J. Mumford; builders, Cornelius Cameron and W. E. Booth.

ALTERATIONS. — *Henry St., No.* 149, add one st'y; also, two-st'y brick extension; cost, $2,500; owner, Asa W. Parker; architects, Parfitt Bros.; builders, Bongard Bros.

Broadway, No. 1575, one and two st'y extension on front; cost, $2,500; owner, St. Francis de Sales Church, Broadway; builder, N. McCormick.

Fourth St., No. 128, one-st'y brick extension; cost, $2,500; owner and architect, Henry McCadden, South Second St., near Second St.; builders, Benj. Mills and G. Laylon.

Myrtle Ave., No. 323, raised 4′; also one-st'y brick extension; cost, $2,500; owner, Mrs. Wilson, 337 Washington Ave.; architect and carpenter, W. Schepper; mason, A. A. Farden.

Court St., No. 508, cor. Wilson St., repair damage by fire; cost, $2,487; owner, T. H. Baldwin, exr., 83 Cedar St., New York; builders, Frank Lyons, Jr., and E. Smith.

Chicago.

HOUSES. — W. L. B. Jenny has plans in hand for President and Faculty houses for Presbyterian Seminary of the north-west, on Halsted St. and Belden Ave.; a house for Dr. Anderson, at Fiftieth St. and Greenwood Ave., to cost $10,000; and house for Carlisle Mason, just north of city limits, in Lake View.

The same architect also has in hand designs for a rustic Episcopal church at Riverside.

BUILDING PERMITS. — Johnson & Arneson, four-st'y brick factory, 50′ x 130′, 239 and 241 Noble St.; cost, $8,000.

A. Hansen, two-st'y and basement brick dwell., 20′ x 42′, 77 Milton St.; cost, $3,000.

C. F. Class, two-st'y and basement brick store and dwell., 22′ x 40′, 887 North Halsted St.; cost, $3,000.

P. Schneider, three-st'y brick store and dwell., 26′ x 100′, 247 North Ave.; cost, $10,000.

E. Krebs, one-st'y brick cottage, 20′ x 50′, 170 Evergreen Ave.; cost, $2,500.

Fritz Buettner, two-st'y brick dwell., 20′ x 50′, 755 North Wells St.; cost, $4,000.

J. L. Campbell, 4 two-st'y and basement brick dwells., 20′ 8″ x 36′, 57 De Kalb St.; cost, $8,000.

J. G. McElroy, three-st'y brick store and dwell., 39′ x 60′, 1001 and 1003 West Lake St ; cost, $10,000.

John McEwen, four-st'y and basement brick factory, 40′ x 150′, No. 243 North Wells St.; cost, $35,000.

Frank Kozesek, two-st'y and basement brick dwell., 21′ x 50′, 269 Maxwell St.; cost, $4,000.

Mrs. Hebard two-st'y and basement brick dwell., 24′ x 38′, No. 3348 Calumet Ave.; cost, $3,000.

M. Bender, two-st'y and basement brick dwell., 22′ x 50′, 327 Webster Ave.; cost, $3,600.

F. Wallender, two-st'y brick dwell., 22′ x 50′, 604 North Robey St.; cost, $3,000.

H. Furst, three-st'y brick flats, 44′ x 60′, 514 and 518 South Union St.; cost, $10,000.

F. E. Walther, two-st'y brick dwell., 21′ x 50′, 160 Fremont St.; cost, $3,000.

St. Thomas Colored Episcopal Church, one-st'y brick church, 32′ x 67′, 2961 and 2963 Dearborn St.; cost, $5,500.

Mrs. Ida Yochem, two-st'y and basement brick store and flats, 25′ x 70′, 3202 State St.; cost, $6,000.

James Sullivan, two-st'y and basement brick dwell., 30′ x 40′, 298 Wells St.; cost, $4,000.

Brunswick & Balke, five st'y and basement brick warehouse, 64′ x 100′, No. 111 Huron St.; cost, $30,000.

Brunswick & Balke, two-st'y brick barn, 31′ x 125′, 97 and 99 Superior St.; cost, $5,000.

Hammond Library Association, two-st'y and basement brick library-building, 43′ x 65′, Ashland Ave., near Warren Ave.; cost, $15,000.

J. L. Campbell, 6 two-st'y brick dwells., 21′ x 36′, 426 South Leavitt St.; cost, $15,000.

Gus Schultz, two-st'y and basement brick dwell., 21′ x 50′, 868 Hinman St.; cost, $2,600.

Richard Sanders, three-st'y brick store and dwell., 25′ x 80′, 3450 State St.; cost, $10,000.

J. Goldenberg, three-st'y and basement brick store, dwell. and barn, 31′ x 82′, 2600 Wentworth Ave.; cost, $6,000.

Wm. McConnell, two-st'y and basement brick dwell., 28′ x 60′, 519 West Chicago Ave.; cost, $5,000.

M. Towner, 2 two-st'y brick dwells., 25′ x 54′ each, Seminary Ave., near Garfield Ave.; cost, $9,000.

D. Stapleton, two-st'y and basement brick dwell., 25′ x 54′, Seminary Ave., near Garfield Ave.; cost, $3,000.

Davis Davenport, two-st'y brick dwell., 20′ x 40′, 3552 Vincennes Ave.; cost, $4,000.

Cribben, Sexton & Co., one-st'y addition to foundry, 97′ x 100′, 78 to 84 Erie St.; cost, $4,000.

C. Kramer, three-st'y and basement brick store

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and flats, 50′ x 66′, Madison St., near Campbell Ave.; cost, $12,000.

M. N. Smith, two-st'y and basement brick flats, 24′ x 60′, 688 North Park Ave.; cost, $5,000.

Wm. N. Arend, two-st'y and basement brick dwell., 20′ x 41′, 487 Belden Ave.; Wm. N. Arend, architect; Mullen & Scheel, builders.

Cincinnati.

Warehouse. — Messrs. Brooks, Waterfield & Co. are to build a tobacco warehouse, 152′ on Front St., running through to water 172′ deep, between Vine and Race Sts., to be of brick, six-st'y; cost, $50,000; Chas. Crapsey, architect.

Building Permits. — Mrs. Williman, addition to two-st'y brick dwell., No. 84 Everett St.; cost, $2,800.

Mrs. Mary Kalbsell, two-st'y frame dwell., Fosdick St.; cost, $2,300.

Theo. F. Neiman, 8 one-st'y frame dwells., Spring Grove Ave.; cost, $3,500.

Mrs. Seidner, two-st'y brick dwell., McLean Ave., near Harrison Ave.; cost, $2,000.

Charles Stengel, two-st'y brick dwell., Coleman Ave., near Alfred St.; cost, $3,000.

Wm. McAlpin, two-st'y brick dwell., Barr St., near Freeman Ave.; cost, $2,800.

Pat McAvoy, two elevator towers, Hamilton County Court-House; cost, $1,700.

Mrs. Harth, two-st'y brick dwell., Chase St., near Chambers St.; cost, $2,500.

Ratterman Bros., four-st'y brick dwell., 77 Elm St.; cost, $4,000.

John Doll, two-st'y brick dwell., State Ave., near Gest St.; cost, $3,000.

Chas. Wellman, two-st'y brick dwell., n w cor. of Cook and Addison Sts.; cost, $5,600.

John Roth, two-st'y brick dwell., Espanola St., near Freeman Ave.; cost, $7,000.

Robert Atkins, two-st'y frame dwell., New Baltimore Pike; cost, $2,100.

John Hanek, two-st'y brick dwell., State Ave., near Harrison Ave.; cost, $2,400.

B. Moonnan, two-st'y brick dwell., Ninth St., near Freeman Ave.; cost, $6,000.

Two permits for repairs; cost, $1,000.

Detroit.

Building Permits. — Henry Schiekel, frame store and 2 dwells., Nos. 220 and 222 Orleans St.; cost, $3,500.

A. C. Varney, brick dwell., No. 181 Miami Ave.; cost, $5,000.

Julius Wilke, frame house, Turnbull Ave.; cost, $2,600.

Thos. Blenman, frame dwells., cor. Croghan and Leib Sts.; cost, $2,800.

A. C. Varney, brick house, No. 311 Second St.; cost, $3,500.

A. C. Winder, brick house, Winder St.; cost, $8,500.

Spitzley Bros., frame house, Brady St.; cost, $3,000.

Four brick stores on Grand River Ave.; cost, $14,000; Donaldson & Meier, architects.

Two brick houses, Cass Ave.; cost, $15,000; owners, Gearing & Co.

Brick house, No. 61 Russell St.; cost, $7,600; owner, C. Wuestewald.

Frame dwell., Fourth St.; cost, $3,000; owner, A. Beaton.

Frame dwell., Twelfth St.; cost, $2,500; owner, A. Beaton.

Brick house, No. 19 West High St.; cost, $5,700; A. E. French, architect.

New York.

Apartment-House. — For Mr. E. V. Loen, a fine apartment-house, 51′ x 90′, is to be built on the cor. of Seventy-ninth St. and Madison Ave. The first story is to be of Belleville brownstone, above Philadelphia face-brick with terra-cotta and iron trimmings. It will have fire-proof stairways, iron bay windows, and all the modern improvements. Messrs. W. H. W. Youngs & H. J. Campbell, architects; cost will be about $100,000.

Residences. — On Eighty-first St., near Tenth Ave., 4 three-st'y and basement residences, to be built of brick, for J. Romaine Brown and others, from designs of Messrs. D. & J. Jardine.

Stable. — For W. J. Sloane, a stable, 25′ x 80′, of brick, with stone finish, is to be built on the north side of Sixty-ninth St., between Lexington and Third Aves, at a cost of about $15,000. The building will be three stories in front, two in rear; Mr. C. W. Romeyn, architect.

Tenement-Houses. — For Messrs. H. and W. Haigh, 2 tenement-houses, 25′ x 67′ each, to be built of brick, are to be built on the south side of One Hundred and First St., between Ninth and Tenth Aves., at a cost of about $15,000. The building will be five-st'y; Messrs. D. & J. Jardine are the architects.

Building Permits. — *Eleventh Ave., No.* 428, four-st'y brick tenement; cost, $8,000; owner and carpenter, Samuel Lee, on premises; architect, Jas. Cody; mason, J. Buckley.

Devoe Ave., refrigerator on bulkhead, West Washington Market; cost, about $6,000; owner, Henry T. Higgins, Chicago, Ill.; builder, A. B. Campbell.

Fifty-sixth St., n s, 225′ e Tenth Ave., five-st'y brownstone tenement; cost, $17,000; owner, Margaret Corrigan, 884 Tenth Ave.; architect, C. F. Ridder, Jr.

One Hundred and Fifty-third St., n w cor. Tenth Ave., two-st'y stone and brick dwell. and office; cost, $10,922; owner, Corporation Trinity Church, S. V. R. Cruger, comptroller, 112 East Thirty-fifth St.; architects, Vaux & Radford; builders, Isaac A. Hopper and L. H. Williams.

One Hundred and Twenty-eighth St., s s, 375′ w Seventh Ave., 2 four-st'y brownstone flats; cost, each, $20,000; owner, Charles H. Fenton, 158 East One Hundred and Twenty-fourth St.; architect, Chas. Baxter.

One Hundred and Twenty-seventh St., s s, 250′ w Third Ave., five-st'y brownstone tenement; cost, $18,000; owner and builder, Stephen J. Wright, 201 West One Hundred and Thirtieth St.; architects, Thom & Wilson.

One Hundred and First St., s s, 325′ w Ninth Ave., 2 five-st'y brick tenements; cost, $7,000; owners and builders, Hartley and William Haigh, 120 East Forty-third St.; architects, D. & J. Jardine.

West Twenty-third St., No. 214, four-st'y brick and brownstone dwell.; cost, $14,000; owner, J. H. Filson, Treasurer of West Third St. Presbyterian Church; architect, J. B. Lord; builders, McKenzie & McPherson.

Kingsbridge Road, n s of Spuyten Duyvil Creek, and 200′ s of H. R. R. R., 2 three-st'y brick stores and dwells.; cost, each, $2,000; owner, Isaac G. Johnson, Spuyten Duyvil, N. Y.; architect, E. A. Quick; builders, J. & G. Stewart and S. F. Quick.

Seventy-sixth St., n s, 225′ e Fourth Ave., 2 four-st'y brick tenements; cost, each, $37,000; owners, architects and builders, Havilah M. Smith & Son, 35 North Moore St.

East Fourteenth St., No. 430, five-st'y brick tenement; cost, $14,000; owner, Richard Deeves, 243 East Thirteenth St.; architect, W. H. W. Youngs.

Fulton St., s e cor. Cliff St., three-st'y Collaberg brick store; cost, $6,000; owner, Louisa Jones, Yonkers, N. Y., and Hannah Dobias; architects, D. & J. Jardine; builder, E. Kilpatrick.

East Thirty-third St., No. 327, one-st'y brick stable; cost, $2,000; owner, Michael Gormley, 325 East Thirty-third St.; builders, J. Gormley and Peter Morris.

One Hundred and Thirty-third St., s s, 450′ w Sixth Ave., 8 three-st'y brick, terra-cotta and stone dwells.; cost, each, $6,500; owner, Anna M. Schmidt, 2204 Third Ave., architect, J. Brandt.

One Hundred and Twenty-ninth St., n s, 215′ e Fourth Ave., five-st'y brick tenement; cost, $18,000; owner, Patrick Whelan, One Hundred and Thirty-eighth St., e of Southern Boulevard; architect, J. F. Burrows.

Alterations. — *Cherry St., Nos.* 456 *to* 464, repair damage by fire; cost, $2,500: owner, Nelson Sherwood, 466 Cherry St.; architect and builder, Geo. Linder.

Broadway, Nos. 649, 651, 653 *and* 655, five-st'y brick extension; interior alterations, etc.; owner, Jacob H. Hecht, 181 Summer St., Boston; architect, H. Fernbach.

Lexington Ave., No. 94, three-st'y brick extensions; cost, $3,500; owner, Annie T. L. Atterbury, Scarsdale, N. Y.; architect and carpenter, J. V. Donvan; builders, D. & E. Herbert.

Third Ave., No. 2376, two-st'y brick extension; cost, $3,000; lessee, James Pilkington, 49 East One Hundred and Twenty-ninth St.; owner, Jas. Ayres, 2365 Third Ave.

East Fourteenth St., No. 634 *to* 640, repair damage by fire; cost, $3,500; owners, Field & Flynn, 957 Madison Ave.; architect and builder, Henry Wallace.

East Fourteenth St., No. 642, rear, repair damage by fire; cost, $4,200; owners, Field & Flynn, 957 Madison Ave.; architect and builder, Henry Wallace.

Twenty-seventh St., Nos. 334, 336 *and* 338, s s, between First and Second Aves., three-st'y brick extensions; cost, $12,000; owners, George Matthews and others of the firm of John Matthews, on premises; architect, T. Dyson; builder, G. Stalger.

West Twenty-fourth St., Nos. 510 *and* 512, an entirely new building except foundation; cost, $5,000; owner, John I. Lawrence, or Lawrence Estate, Worth St., s e cor. Hudson St.; architect, J. D. Frequet; builder, J. G. McMurray.

Philadelphia.

Alteration. — Enlarging and remodelling of house No. 1913 Arch St., for Mr. Jno. Lucas; John J. Deery, architect.

Houses. — At No. 1423 Poplar St., new residence for Mrs. Mary Agnew, main building, 23′ x 36′, back building 16′ x 48′, to be of brick, four-st'y; John J. Deery, architect.

Three-st'y brownstone and brick house, 50′ x 68′, on Twenty-second St., above Walnut St., for Travis Cochran, Esq.; cost, $32,000; Jas. Errickson, builder; Geo. W. Hewitt, architect.

Building Permits. — *Orianna St.*, e s, s of Lehigh Ave., 3 two-st'y dwells., 13′ x 28′; Michael Fox, owner.

Dauphin St., s s, e of Frankford Road, three-st'y addition and three-st'y addition and stable, 16′ x 32′ and 26′ x 32′; Philip Reeder, owner.

Fayette and Baker Sts., e of Broad St., two-st'y stocking-factory, 20′ x 32′; Benj. Walker, contractor.

Kensington Ave., w s, s of Huntingdon St., 3 three-st'y stores and dwells., 18′ x 40′ and 20′ x 52′; J. K. Knorr, owner.

Cambridge St., n s, w of Carlisle St., 8 three-st'y dwells., 14′ x 37′; Wm. Weightman, owner.

Vine St., No. 1815, fourth-st'y addition to dwell., 38′ x 46′; J. E. & A. L. Pennock, contractors.

Twenty-second St., e s, n of Walnut St., three-st'y dwell., 44′ x 57′; J. H. Errickson, contractor.

Twentieth St., s, three-st'y dwell., 17′ x 46′; P. Thompson, contractor.

Fairmount Ave., s s, e of Fifteenth St., two-st'y stable, 24′ x 50′; Wm. Smith, contractor.

Dickinson St., s e cor. Chadwick St., 24 two-st'y dwells., 15′ x 38′ and 18′ x 45′; F. A. Collamer, owner.

Fifth St., w s, n of Butler St., second and third st'y addition to shop, 30′ x 60′; David Maroney, owner.

Herman St., s s, w of Twenty-seventh St., three-st'y dwell., 42′ x 86′; F. McEntee, owner.

Marshall St., No. 942, 4 three-st'y dwells., 14′ x 36′; Chas. Falsteth, contractor.

Ellsworth St., n s, s of Marshall St., and w of Broad St., 30 two-st'y dwells., 14′ x 26′ and 16′ x 50′; R. Shoch, owner.

Sansom St., n s, e of Thirty-ninth St., two-st'y stable, 35′ x 42′; W. Devitt & Son, contractors.

Philip St., e s, *No.* 1619, n of Oxford St., three-st'y dwell., 18′ x 30′; Jno. Mander.

Taylor St., n s, w of Ninth St., No. 904, 2 two-st'y dwells., 16′ x 28′; Philip McManus, owner.

North Second St., No. 1911, one-st'y store, 30′ x 119′; S. R. Stewart, contractor.

Richmond St., e s, n of Neff St., 2 three-st'y dwells., 20′ x 56′; Jacob Ziegler, contractor.

Gray's Ferry Road, s e cor. Thirty-second St., one-st'y store, 62′ x 80′; Wm. Baxter, owner.

Cumberland St., s s, w of Broad St., three-st'y store and dwell., 18′ x 40′; Jno. Holton, owner.

Seventeenth St., e s, n of Tasker St., two-st'y dwell., 18′ x 3′; M. J. Duross, contractor.

Tilton St, e s, s of Lehigh Ave., 3 two-st'y dwells., 12′ x 28′; Jas. Tucker, owner.

Broad St., n w cor. Chestnut Sts., four-st'y store, 18′ x 77′; R. G. Black, contractor.

Portland, Ore.

Houses. — Mrs. Hawthorn is putting up a two-st'y brick dwell., 50′ x 50′; cost, $7,400; Haine Bros., contractors.

Mr. Lambert is putting up a two-st'y frame dwell., 50′ frontage, the lower part for stores; Sedge, contractor; Burton, architect; cost, $5,200.

Mr. Verdier is putting up a two-st'y brick dwell., 50′ frontage; cost, about $12,000; R. Robinson, contractor; W. H. Williams, architect.

W. S. Ladd is building a two-st'y residence; cost, $4,000; P. Lundin, contractor; J. Krumbein, architect.

Mr. Hoydt is putting up a two-st'y house, costing nearly $7,000; Kelton, contractor; J. Krumbein, architect.

O. A. Alisky is putting up a three-st'y brick dwell., 30′ x 70′; R. R. Robinson, contractor; J. Krumbein, architect.

Asylum. — Mr. Krumbein is preparing plans for an Odd Fellows' orphans' home, frame; cost, about $10,000.

St. Louis.

Building Permits. — Forty-eight permits have been issued since our last report, thirty of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Michael Stephan, two-st'y double tenement; cost, $2,790; H. Rickmann, contractor.

John Backula, two-st'y double tenement; cost, $3,700; Hermann & Shumacker, contractors.

John Farrell, two-st'y double tenement; cost, $3,000; John Farrell, contractor.

P. Baggot, two-st'y dwell.; cost, $5,500; J. Johnson, architect; C. C. Murphy, contractor.

J. C. Brockmeier, one-st'y dwell.; cost, $2,500; J. C. Brockmeier, contractor.

Conrades & Logemann, six-st'y warehouse; cost, $17,000; A. Beincke, architect; Aug. Beincke, contractor.

Joseph Schwab, four-st'y stores; cost, $20,000; A. Beincke, architect; M. Kirkwood, contractor.

George Rogers, 2 two-st'y dwells.; cost, $5,000; A. Beincke, architect; J. Flannery, contractor.

George Rogers, 3 two-st'y dwells.; cost, $10,000; A. Beincke, architect; J. Flannery, contractor.

Joshua Rech, 2 two-st'y dwells.; cost, $4,500; F. Müller, contractor.

General Notes.

Alameda, Cal. — Work has just been begun on a fine residence for F. N. Delanoy on the n w cor. of Union St. and Central Ave.

Bangor, Me. — Rectory, of wood, for St. John's Catholic Church; cost, about $10,000; Mr. Vinal, of Boston, architect.

Two-st'y high school building, of wood, 80′ x 92′, for City of Bangor; cost, about $20,000; from designs of W. E. Manser.

The Boston & Bangor Steamship Co. are to build new storehouses at their wharves in this city.

Cambridge, Md.—County jail, 32′ x 70′, two stories, to be built of stone, and cost about $20,000; Mr. Chas. L. Carson, Baltimore, architect.

Coldstream Harbor, N. Y. — A cottage is to be built for Dr. Cook, from designs of Messrs. Rossiter & Wright, of New York.

Denver, Col. — For Mr. W. S. Ward a handsome residence in the Elizabethan style, to be built of brick, stone and timber; also, a row of smaller houses are to be built, from designs of Mr. H. R. Marshall, of New York.

Fowler, O. — A two-st'y brick addition to store-building, 22′ x 100′, is to be built for David Harpster; cost, $2,500; N. B. Bacon, architect. Work to begin in September.

Hanford County, Md. — Mr. George R. Glasgow, two-and-a-half-st'y frame cottage, on stone foundation, near Churchville; cost, $4,000; Mr. J. H. R. Bull, builder; Mr. Geo. Archer, Baltimore, architect.

Islesboro, Me. — Cottage for J. W. Milliken, Esq., of Bangor; cost, about $2,500; from designs of W. E. Manser, of Bangor.

Islip, L. I. — Several cottages are in course of erection. Mr. Chas. W. Clinton, of New York, is preparing plans for one to be built for Mr. A. Meeks, to cost about $12,000. It is to be in the English style.

Luray, Va. — Frame houses are being erected here by the following persons: Hubert Hudson, Col. Mann Spettler, Stewart Grayson, Joseph Wheat, Wm. O'Neil, A. W. McKim, and others.

McMunville, Ore. — Plans have been prepared for a two st'y brick Masonic hall, 30′ x 80′; cost, $4,500.

John Sax will shortly build a two-st'y grain warehouse, 36′ x 56′; cost, $5,000.

Milton, Mass. — Messrs. Rotch & Tilden are remodelling Hon. Edw. L. Pierce's house.

Mantoloken, N. J. — A cottage is to be built for F. W. Downer; Messrs. Rossiter & Wright, of New York, architects.

Natural Bridge, Va. — The S. V. R. R. Co. are building a station-house at Glenwood, for the convenience of tourists to the Natural Bridge.

Newport, R. I. — Mr. Robert S. Hone, of New York, will build a cottage near Carey St.

New Tacoma, W. T. — The court-house contract has been let to W. H. Morrell, for $6,800.

Peeksville, N. Y. — A new hotel is to be built adjacent to the State camp grounds.

San Francisco, Cal. — Building here quite steady. Plans are finished for new art-building, to cost $250,000; front glazed brick, iron and stone; Messrs. Wright & Sanders, architects. Several business buildings, from $20,000 to $75,000, are in course of erection.

The demand for residence property is good, and altogether business is very encouraging at present time.

Carpenters, $3.50; masons, $4.50 and $5 00; plumbers, $4.00 and $5.00; plasterers, $4.00 and $4.50; painters, $3.00 and $3.50; lumber, same as last report.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co. No. 348.

AUGUST 26, 1882.

Entered at the Post Office at Boston as second-class matter.

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A CIRCULAR has been sent to us, with a request that we should give it "such notice as we might deem it worthy of," containing an invitation to architects to supply plans for primary school buildings for the city of Brooklyn, New York. Three varieties of school buildings are required, one to cost fifteen thousand dollars, the second twenty thousand and the third twenty-five thousand. Separate and complete working plans and specifications are to be made for each building, showing drainage, provision for heating, and so on; and the express stipulation is made that no plans will be returned. The recompense offered to the profession for the contribution of an indefinite number of working-drawings is, for the twenty-five thousand-dollar building, one hundred and fifty dollars, — that is, six-tenths of one per cent on the cost; a little more than one-sixth the price which would have to be paid to an architect of any character for *one* set of drawings. The "prizes" for the smaller buildings are somewhat more munificent, amounting to two hundred dollars, or one per cent, for the twenty-thousand-dollar school-house, and two hundred and fifty for that to cost fifteen thousand dollars. The committee which is to award the laurels of the contest consists of the President of the Board of Education, the Chairman of the School-house Committee, the Superintendent of Public Instruction, the Superintendent of Buildings of the Board of Education, and the City Building Commissioner. We see nothing about the submission of the plans to the judgment of an architect, that is, a man whose business it is to understand plans, to see through draughtsmen's tricks and errors, to estimate with precision the effect of ventilation and heating flues, and to set a proper value on artistic effect; and we therefore infer that this is not intended.

A GOOD deal of indignation has been excited in New York over the conduct of a certain hotel proprietor, who certainly does not appear to be gifted with that spirit of self-sacrificing benevolence which is so desirable in men of his profession. It seems that this summer he had opened a hotel at Seabright, on the New Jersey coast, which was soon filled with boarders and promised to bring him in a good profit, when suddenly two of his guests were seized with typhoid fever, and as usually happens in such cases, most of the others packed their trunks at once and gave notice of their intention to leave the place. It was in evidence before the Board of Health, which afterwards investigated the matter, that the lavatories of the hotel had been in a foul and offensive condition during a considerable part of the season, and the tank in the roof, to which water was intended to be pumped for flushing the closets, is said to have remained empty for six weeks at a time. Nevertheless, the proprietor chose to consider that the two unfortunate patients, rather than his own neglect, were responsible for the untimely end of his prosperous season, and having perhaps no other way of showing his resentment, he announced that his establishment was to be immediately closed, and that the invalids must find accommodation elsewhere. The attending physician in vain represented that removal would probably be fatal to one or both of them; the landlord was obdurate, and might have proceeded to carry out his threat had not the happy thought occurred to him that if their friends would pay him "the expenses" of keeping the house open until they could be moved he might be induced to relent. On further inquiry it appeared that the sum needed for this purpose would be five thousand dollars, to be paid in advance in cash, and rather than see the helpless invalids turned out, perhaps to die at the door, the brother-in-law of one and the husband of the other drew their checks for twenty-five hundred dollars each, which the landlord, after requiring that they should be certified, to make sure "that no game was being played on him," was graciously pleased to accept as consideration for his clemency.

THE New York *Times* states that the extensive operations of excavation which have been in progress for some months in the lower part of that city, where the steam and electric mains of the Edison and the New York Steam Companies are being rapidly laid, have been accompanied by a remarkable increase of malarial diseases in the neighborhood, and in view of this circumstance it suggests a theory of the causation of malaria which is, to us at least, quite new. "It has," as it says, "long been suspected by the most acute observers that there is an intimate relation between the development of malarial diseases and the setting free of the carbonic acid in the soil; in other words, that intermittent fever and kindred complaints are only another name for slow carbonic-oxide poisoning." We confess that the chemistry of this hypothesis is not quite clear to us, and it is not made any more intelligible by a sentence below, which says that "It is a curious fact, also, to be noted in this connection, that carbolic acid in small doses, long continued, produces a type of periodical fever that can scarcely be distinguished from legitimate malarial disease;" but we do not wish to be too critical, and we are glad to warn our readers that if they perceive any carbonic acid, or carbolic acid, or carbonic oxide coming out of holes in the ground, they will do well to recollect that one of these — we are not quite sure which — "is a narcotic poison of the most silent and insidious kind," and that by taking promptly to their heels they may save themselves from an attack either of "periodical fever" or of "legitimate malarial disease."

BY the omission, as is supposed, of some of the bolts which hold together the lining-plates of the Hudson River Tunnel, a "blow-out" occurred on Sunday evening, allowing the water to penetrate and fill the excavation on the New York side as far as the air-lock. No one was injured, the entrance of the water being so slow that all the men at work in the tunnel had time to escape, and operations will probably be resumed in a few days. Considering the difficulty of sustaining a bank of porous gravel, such as forms the New York shore of the river, by means of atmospheric pressure, the excavation of that end of the tunnel has been conducted with remarkable success. Before many days the gravel deposit will be passed and firm silt reached, in which boring is much more regular and safe, and it is to be hoped that the most serious dangers of the work will then be over. On the New Jersey side the tunnel now extends more than thirteen hundred feet from the shore, a greater distance by one hundred and twenty feet than the entire length of the Thames tunnel between the shafts.

IN mentioning the other day the fact that some of the illnesses which occurred last year at Nahant were traced by Mr. Bowditch, the expert who examined the water-supply, to ice cut from a body of impure water called Flax Pond, we took occasion to comment on the carelessness with which the choice of ice supply is often made. Since then we have noticed a statement that the fish in the same Flax Pond had died this season in large numbers, and that an investigation had traced the mortality to the large proportion of *arsenic* contained in the water, and derived from the waste of a manufactory of some kind on the shore. Whether this fearful poison formed an ingredient in the Nahant ice last year we have not learned, nor whether it is proposed to cut the next season's supply from the same source under these circumstances; but it will do no harm to repeat our suggestion, that some kind of inspection of the ice industry has become very desirable.

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The "war-cloud" of the incandescent lamps is gradually becoming more threatening, and we may expect any day to hear the thunders which precede the mortal shock. The Brush Electric-Light Company has adopted an excellent scheme, by which houses and stores along the line of the streets where its arc-light is used at night are to be supplied with storage batteries and a full outfit of Swan incandescent lamps. Each storage battery weighs about a ton, and will furnish ample power for maintaining the usual number of lights in a dwelling-house for twelve hours at least. By means of a switch the current from the dynamo-electric machine can be turned either through the arc-lights or the storage batteries, and instead of stopping the engines at a given hour, they will run night and day, the power when not needed for the arc-lights being turned into the batteries, keeping them always well supplied with electricity, to be drawn upon as needed for the incandescent lamps in the houses. In preparation for the introduction of this system on an extensive scale the company is manufacturing the Swan lamps at the rate of five hundred per day, and has just begun the regular fabrication of batteries. Meanwhile, the Edison Company announces its intention, as soon as the sale of the Swan lamp begins, to commence action for infringement of the Edison patent, while the French Light-and-Force Company, the proprietor of the Faure patents, also gives notice of its purpose of entering a similar suit as soon as the first Brush storage battery is put upon the market. The impending struggle is likely to affect the public in an unexpected and disagreeable way unless precautions are taken beforehand, since the purchasers and users, as well as the sellers, of infringements of patented articles are liable for damages; and we would repeat the suggestion already made by Mr. Atkinson to the mill-owners, that whoever buys or consents to use storage batteries or incandescent lamps of any kind should secure himself by a satisfactory bond under seal from the company or individual from whom he obtains them, guaranteeing to hold him harmless from all royalties, costs and damages of every kind which may at any time fall upon him in respect of them.

M. Ravon, the Secretary of the Committee of Jurisprudence, to whom are assigned the various questions upon legal matters asked by the correspondents of *La Semaine des Contructeurs*, makes some important suggestions in a recent reply to a letter written by a certain contractor. This contractor complains that he had made an agreement to do the work of restoring a certain church. During the progress of the operations, the architect, at the request of the building committee, and without the knowledge of the contractor, drew up an amended specification, striking out certain portions of the work described in the first one, and substituting other work, which had not been foreseen in the first specification, but was found necessary as the building went on. Other modifications were made in the course of the work, including the reconstruction of a large portion of the vaulting, upon the verbal order of the architect, who, however, furnished detail drawings for each portion. From time to time statements of the work done were furnished by the contractor, but without paying any attention to these the building committee demanded of the architect, who seems to have stood in mortal fear of them, that he should prepare an account, which he did, leaving out all the extra work done on his verbal order, and, according to the contractor's story, taking the quantities, not from the actual building, but from his own imagination, in such a way as to make them accord with his own preliminary estimate. In consequence of this, the contractor claims that a balance of twenty-eight thousand francs is still due him, of which he cannot obtain payment, and he asks, (1) whether the architect ought not to have communicated to him the specification which he substituted for that included in the contract; (2) whether the drawings delivered by the architect for the extra work were equivalent to a written order, and (3) whether he is not entitled to compel the architect to make a correct account in place of the fictitious one which he had presented to the committee.

In reply M. Ravon says, (1) that the architect, as agent of the building committee, is responsible solely to them, and that the contractor cannot concern himself about the mistakes of which he may have been guilty; (2) that the drawings given for the extra vaulting constituted a graphic order, which was equivalent to a written order, and even more binding because more precise, and (3) that the contractor has no power to compel the architect to correct his accounts. In the words of *La Semaine*, there is no legal connection (*lien de droit*) between the contractor and the architect, and the former cannot compel the latter to do anything whatever. In regard to the second question, we think that M. Ravon's answer should be taken with allowance, for this country at least, If a contract provides, as most good ones do, that no order for alterations which either increase or diminish the value of the work shall be valid unless given in writing, we doubt very much whether a drawing would be taken as legally equivalent to a written order. In fact it should not be; the intention of the clause requiring written orders for extra work is to permit the architect or owner to make trifling modifications of detail as a building goes on, without expense to any one, and without being annoyed by a shower of petty claims at the completion of the structure, after everybody has forgotten the circumstances of the modifications; as well as to protect the contractor, who is not obliged to incur any cost without a written order, and is furnished by it with the means of collecting payment with certainty for all the extra work which he does. Such an order as this is a virtual agreement that the work described in it shall be regarded as extra, and is a very different thing from a drawing, which would often be necessary to show an alternative arrangement of no greater cost than the one which it superseded.

The Fifth Annual Congress of German Architects and Engineers was to be held in the city of Hannover on Monday last. Professional societies are very popular just now in Germany, and the Congress was expected to call together a much larger number of persons than would be likely to attend any similar convention in this country, but the provisions for instruction and entertainment set forth in the programme are very similar to those customary here. The audience-room of the old Town-hall was lent by the city for the meeting of the architectural sections, while the various engineering sections were to occupy smaller rooms in the same building, and a General Inquiry Office for the convenience of strangers from a distance was to be kept open in the same place. On Sunday a public reception was given to the societies by the municipality of Hannover, and on Monday the business of the Congress began, with the consideration of various important professional topics. In the afternoon the members dispersed to inspect some of the more interesting buildings of the city, to meet again at six o'clock at a dinner in the Tivoli Gardens, finishing with a reception in the rooms of the Artists' Club. The next day, after the mornings' business, a special train was chartered to convey those who wished to the city of Brunswick, where the local Architects' Club had arranged to receive them, and after conducting them about the place to entertain them at dinner. The next two days were to be spent in much the same way, the excursions of the afternoon being to the suburb of Herrenhausen on Wednesday, and to Bremen on Thursday. Here another reception by the Bremen Artists' Club, and a banquet in the Town-hall, were to conclude the amusements of the Congress.

A trial has been made in Pittsburgh of an electric motor for common street-cars, which is said to have been quite successful. As in the Siemens and Halske railway, the current is conveyed to the car by means of a wire, suspended from brackets attached to posts set beside the track, on which runs a pulley connected by wires with the car. The electro-motor appears to be of the ordinary kind, and is said to be capable of driving the car at the rate of ten miles an hour. The main objection to this, as to all street railways operated by electricity, would naturally be the obstruction caused by the line of posts which carry the main conducting wire; and in most cases such an objection would prevent even the consideration of the plan. Another practical difficulty would undoubtedly be the liability to stoppage of the current by accumulations of mud or dust on the tracks. A very slight separation of the driving wheel from the rail by the interposition of a non-conducting substance would instantly stop the movement of the car, and unskilful attempts at restoring the current would be attended by great risk. Nevertheless, we hope that the experiment will be continued, not so much for the sake of its probable use on street-car lines as for the service of the elevated railways, which furnish the best possible field for the development of a system of locomotion requiring clean rails, a safe isolation of conductors and motors from the effect of curiosity or accident, and a regular supply of power.

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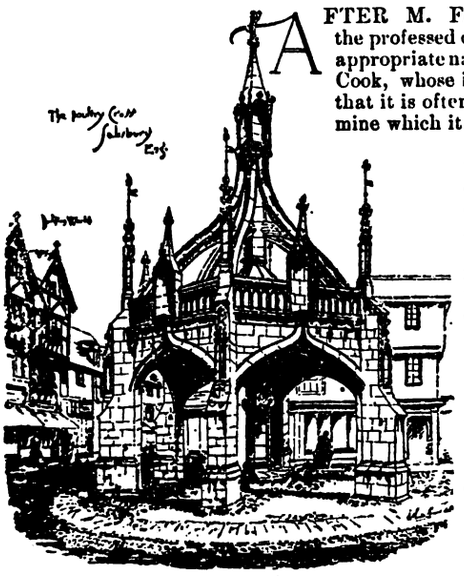
MR. COOK ON AMERICAN ARCHITECTURE.



AFTER M. Francisque Sarcey, the professed critic with the most appropriate name is Mr. Clarence Cook, whose impetuosity is such that it is often difficult to determine which it is that is the most thoroughly done, the critic or the criticised. The career of the professional critic is an attractive one, for the influence a trained mind can exert through the medium of the public prints is immense, and correspondingly flattering to one's vanity. The place he fills in the social economy is both useful and honorable, and as it is rare indeed in this country that even the most unbridled causticity of language ever involves its author in other than a wordy warfare, and the private life of an American critic therefore lacks one of the elements of excitement and interest that in some countries attends that of his European confrère, we do not wonder there are so many willing to attempt the rôle.

If Mr. Cook's writing is sometimes less polished than that of the eminent Frenchman, to whom we have for the moment compared him, it is never less uncompromisingly direct and emphatic. There is never any possibility of misunderstanding what is the attitude of his mind — at the moment of writing. It is this attribute quite as much as his general reputation as a critic that will make the architectural world turn with interest to his paper on American Architecture in the last *North American Review*, only we fear to be disappointed, for they will find instead of the quiet and well-ordered analysis that one would look for in a paper written for that magazine, a rather vituperative article, which would have been better placed in a daily paper. The impression it leaves is that a brilliant general writer has, at request, attempted a subject without having taken the trouble even to book himself up on it, trusting to his own special skill as a writer, and the superficial knowledge that every one has of architecture to satisfy his editor's demands and command the applause of the unthoughtful of his readers; for it is only necessary for some one, supposed to speak with the voice of authority, to cry "harry" in order to raise up quite a respectable hue-and-cry against any of the professions. Doctors, lawyers, clergymen, like members of some of the humbler crafts, are in turn, as a class, the subject of public clamor: men whose individual capacities and conduct are as varied as those of the same number of business men,— the majority of men in the same social rank, — who alone seem to be exempt from public criticism and censure. Just at present it is the fashion to cry out upon the architects, and why? Largely because they are doing the very thing they are so often exhorted to do: trying to disembarrass themselves from the restrictions of precedent, seeking to be original,— too often, alas! succeeding,— striving to evolve that typical American style, which we think is already a more developed entity than most people imagine.

The profession can afford to shrug its shoulders at such apothegmatical utterances as: "Where architects abound the art of building always deteriorates!" or such sweeping statements as: "It is to architects that we owe all the ugly building that offends us in our large cities and in our country towns and fashionable summer quarters!" qualified as this last condemnation is by the subsequent admission that "it is to architects that we owe, now-a-days, the few, the very few buildings on which our eyes can look with any pleasure." We could wish that some of these buildings which the public may be allowed to respectfully admire had been mentioned; but to such a service as this the critic who approaches his subject in the mood of the writer rarely stoops: for the time being he is an iconoclast only, not a reformer.

It would be a possible thing to weaken the effect of the assertion that "if architects had been needed to build the better sort of structures [the colonial mansions] the lesser sort [the cottages] would never have been so good as they are," or the historical discovery that "architects may have designed the bad ones [the houses of Venice], but never the good ones," by simply proving that they were designed by architects.

Professor Huxley's brick-layer has found a new champion, who, however, bases his conclusions not on facts or inductive reasoning, but *believes* that all the fine old houses of Gloucester, Portsmouth, Hingham, Newport, and the old New Jersey towns were "the work of simple 'builders' who knew their trade and never cared to give themselves a finer name." The name—it really seems as if the name were the chief matter of offence—is an inferior consideration, but it is absurd to imagine that these buildings were devised by men of the simple training of the Englishman's pet brick-layer. If trained in design, what matters it whether they styled themselves builders, master-builders, or architects? They thought about their work, they studied it, they refined it. What more do architects do—or try to do? and in what were the authors of these buildings not architects, even if they lacked the offending title? That we do not know who were the architects of those old-time buildings of all countries and ages which, according to the predilection of the exhorter, are held up as examples before the back-sliding architect of to-day, does not prove that their authors were not themselves architects. Human nature then was probably very similar to what it now is, and it is not unlikely that the owner in those golden days told his architect "just what to do," and "really designed the house himself, you know"; that the public prints, or public rumor, placed on record the names of the masonic dignitaries who laid the corner-stone, of the orator of the occasion, and of the building committee before all; gave minute account of the character of the building as appreciated by the reporter of those days, but forgot in quite a modern fashion that there had been one controlling mind in charge of all, and made no mention of the architect. So short-lived, indeed, is the fame of an architect's performances even in these days of recordings and public prints that our critic is unable to discover—or has not taken the trouble to—the name of the author of one of the stock laughing-stocks of the superficial critics of American architecture,—the Stewart down-town store,—but contents himself with styling him a "man."

Unfortunately, we cannot take exceptions to the matter of Mr. Cook's criticisms as much as to the manner, and the manner could better have been overlooked had the matter more depth. The fact that they might be the quoted remarks of any chance passer does not detract from their truthfulness, though it may somewhat dim their freshness and originality. The Vanderbilt houses are not what they might — should have been; the Boston Museum of Fine Arts does look like the work of a man whose inspirations were largely derived from books and photographs, and "finikin fine" may not be an inappropriate phrase to apply to it; a competent critic could have picked out worse things about the Harvard Alumni Hall than the sculptured roundels of the Sanders Theatre; the present architects of the Albany Capitol can never make that building a consistent piece of architecture; the fine tower of the Brattle Church is open to the objection that its striking sculptured frieze is the work of Bartholdi, "a man whose works seem by some fatality to have been unloaded upon this bedeviled land"; and there can be no doubt that the Brimmer houses are an offence to Beacon Street, "enjoying her dowager respectable slumber"; but the fact is overlooked that these same houses are the last word—and fortunately — of the Neo-Grec style, the one style, or sub-style, which modern architects may fairly claim to have created, as a consequence perhaps of all the abuse that has been showered upon them for adopting or adapting the good points in whole or in parts of the styles in which their fore-goers worked. We regret as much as any one that our clever young architects "invite us to a feast of scraps," and do not succeed in managing their picturesque effects with more sobriety; but we believe they are in the right track: the contracting grasp of precedent is loosened, and with freshly awakened perceptions they are all conscientiously seeking to do in those works which they acknowledge to be their best work, and not mere pot-boilers designed to satisfy the owner's pet hobbies, just what all the critics would have them do, — plan the building for its real uses and build it as it is planned, honestly, simply, and appropriately.

It is the fashion now to admire the old colonial work and apparently it is this particular style of building that our critic would have architects copy. Copy! and yet why so denunciatory of copyists of other styles? We suppose the outward appearance of these charming old buildings is what we are to follow, for another lay-critic would hardly dare to invade the preserves which Mr. Atkinson shoots over with such success — the criticism of modern construction; and as for the planning of a building, we not only hold that few critics or building-committees are able to appreciate that portion of an architect's work, but we believe that the layman's idea of an architect's work is so entirely that it begins and ends with the "drawing of pictures" of the outside, that the plan never occurs to him when he makes a criticism. If our inference is true we are to reproduce the external attributes of the cottages and small houses of the last century which "are the true type of a domestic architecture fitted to our climate and to our general mode of living." This they distinctly are not. They are plain, straight-forward, charming now, with a quaintness lent them by age and fortuitous surroundings and they possess many admirable features, but a long residence in one of them proves that they are not suited to our climate, unless the inmates lead the same active hardy lives that the original builders led, and that their arrangement is wholly foreign to the general mode of modern living and can never be other than inconvenient. But to study these old buildings as buildings of accepted styles in older countries are studied, until an insight is obtained of the faithfulness and uprightness with which they were wrought, to appreciate their good points and then to adapt them to modern requirements is an exceedingly proper and praiseworthy thing to do, and it is just this that the younger school of architects, especially, is doing, and, novelty waning, the later work of these men will show that the good points have been assimilated to modern usages and that an American style of architecture will then begin to be discern-

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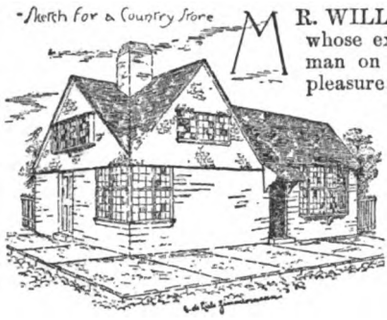
ible to critics, as it now is to architects. To say these things in a journal which is read chiefly by architects may not avail much, but we trust that in this case the editor of the *North American Review* has followed his usual policy and has already requested some member of the profession to reply to Mr. Cook's impeachment; if this has been done we trust that a writer will be found who will understand that it is possible to write for the people in other than what is usually understood as a "popular style."

A COMPENDIUM OF SANITARY APPLIANCES.[1]



MR. WILLIAM PAUL GERHARD, whose excellent little work in German on house-drainage we had the pleasure of noticing some time ago, was employed by the Rhode Island State Board of Health last year to prepare a general paper upon the sanitary appliances suitable to dwelling-houses. This paper, prepared with great pains and very plentifully illustrated with cuts, has been recently reprinted in the form of a pamphlet of about a hundred pages, and furnishes the best and most modern treatise on the subject with which we are acquainted.

The writer omits any consideration of the various methods of sewage disposal, which would much increase the size of his book, and confines himself strictly to the interior arrangements by which liquid and semi-liquid wastes are removed as quickly from the dwelling as possible, the return of foul gases from sewers or cesspools through the outlet channels prevented, and the house-drainage system opened to thorough purification by that greatest of oxidizing and cleansing agents, atmospheric air. Beginning with some advice about the laying and jointing of pipe-drains, a natural transition leads to the consideration of other waste and soil pipes, thence to the principles of trapping, and finally to the various forms of fixtures in common use. In all these departments the treatment is characterized by a directness and clearness of statement which indicates practical as well as theoretical knowledge, and the counsel given is infinitely more valuable on that account.

For ourselves we should be glad to see this independence of assertion carried still farther, and the results of the writer's experience stated without any deference whatever to the opinions or feelings of patentees or others, but this is not always possible without doing injustice, and Mr. Gerhard is too modest, as well as too considerate, to run the risk of doing injury by unguarded statements. On the selection of earthenware drain-pipes, for instance, he does not venture to offer any suggestions except some general ones as to the need of strength, good and smooth glazing and perfect form, which have little value to the ordinary householder unless he has also some rules given him by which he can estimate these qualities in the pipes which his contractor brings him, without having to rely wholly on the latter's asseverations. Mr. Gerhard, for instance, says that vitrified pipe is better than cement pipe, which is undoubtedly true, taken as referring to the best vitrified pipe; but immense quantities of earthenware pipes are sold which are inferior to those of well-made cement composition. Every architect meets occasionally with straight, well-formed pipes, generally of unusual thickness and apparent strength, and shining with a smooth glaze, which decay rapidly in the ground, and are very brittle, showing a soft, clayey fracture. Such pipes as these are unfit for use, and to our eye a few curvatures in a load of pipes, showing the thoroughness of their vitrification, give more satisfaction than a suspicious perfection of form, especially as the evil effects of a slight bend can be quite eliminated by laying the pipe so as to bring the curvature in a horizontal plane, or rather in one parallel with the general inclination of the drain. Again the excellent Akron pipes answer the requirement of smooth glazing less perfectly than many inferior kinds, and there are qualities, such as depth and form of hub, which need consideration as well as the perfection of manufacture. A little too much complaisance, we think, has in the same way led the author to give a reluctant countenance to the practice of clay jointing for drains, which was once, for what reason we cannot conceive, advocated by certain English writers on the subject. One look at a line of clay joints after a year's use would, we think, lead Mr. Gerhard to substitute a total condemnation for his mild deprecation. To speak briefly, such joints, though cheap, are worthless, and therefore dangerous. The alternate shrinking and swelling of the clay from the water, which it absorbs like a sponge, speedily disintegrates it; the joint falls away in scales toward the outside, and the small amount of resistance which it presented at first to the passage of liquid soon disappears. The elasticity of the joint, which is the theoretical virtue of the clay luting, is under ordinary circumstances of no use whatever. With good hard pipes, properly bedded and jointed with fresh Portland cement, there should be no settlement, nor should the superincumbent weight be worth a moment's thought. In bad soils, where movement is inevitable, the Stanford pipes with flexible joints, which, as Mr. Gerhard informs us, have been used in Norfolk, Va., answer the best purpose. The practical direction for wiping out the cement joints with a rag tied to a stick, which is given in speaking of the proper mode of laying, needs, we think, to be taken with caution. A very quick workman might be able to get all the joints wiped out in this way before the cement had set too hard to yield to the soft cloth, but with good Portland or Rosendale cement, in hot weather, the portions which protrude into the pipe harden in a few minutes to so firm a consistency that forcible scraping is necessary to detach them, and a semicircular wooden disc, well secured to a stout handle, forms a much more reliable tool than the rattan and rag.

Concerning the proper size for house-drains, Mr. Gerhard pronounces in favor of four-inch pipe, as being "ample for an ordinary city dwelling, including all the rain-fall." "For a larger lot and residence a six-inch drain is all that is needed." We should be inclined to put this quite differently. City houses, built in compact blocks, are apt to be among the most trying of all buildings to drain properly. While in country houses the water from the roof is almost always either collected in cisterns or allowed to escape upon the surface of the ground, without entering the drains at all, leaving to these only the waste from the house-fixtures, which is very insignificant in amount in comparison with the rain-fall; a city house-drain must carry away, in addition to the sink, bath, basin and closet wastes, all the storm-water from roof, yard and areas. The total of this from a lot of twenty-five by a hundred and fifty feet, for instance, will at times charge a four-inch pipe so nearly to its full capacity that a comparatively slight obstruction may cause the backing up of the liquid through the basement fixtures. Moreover, if no other exists, an obstruction quite sufficient to bring about this result in a small pipe is often found in the air-trap which is formed in storms between the main house-trap, just outside the cellar-wall, and the lower end of the pipe, if this is entered at so low a level into the sewer as to be sealed by the flow. It was once very common, and is sometimes necessary, to make the junctions of house-drains with sewers below the usual water-level, and where an additional house-trap is employed the intermediate space encloses a cushion of air, whose elastic movement, when irregularly compressed by a storm-flow, will sometimes raise the water in the house-pipes to a height of a foot or two, overflowing cellar-drains and hoppers. For this reason, among others, we should hesitate to recommend a main-drain of less than five inches calibre for ordinary city houses, and even for country mansions we confess our preference for the same size.

Attention is called in describing the various kinds of iron pipes to the dangerous carelessness with which the heaviest soil-pipe is cast, and we hope that the manufacturers of such goods will not resent our seconding Mr. Gerhard by a direct appeal to them to improve its quality. Nominally, the extra-thick four-inch soil-pipe, weighing thirteen pounds to the foot, should have a shell of a uniform thickness of about $\frac{5}{16}$ of an inch. Practically, the shell often varies in thickness from nearly half an inch on one side to one-eighth or less on the other. The reason of this is said to be that the extra-thick pipe, being of a limited sale, is made with less care, but whatever the cause may be the result is most discreditable to the manufacturers.

Next to these general remarks upon drain and waste pipes, which could hardly be improved, comes a diagram of plumbing-work for an ordinary dwelling-house, which will probably excite more discussion among plumbers than anything else in the book. The diagram is very clear and well drawn, is dated 1882, and shows the most modern forms of apparatus; but while two water-closets and a slop-hopper are indicated with S-traps and back vents, none of the other fixtures, including a water-closet of the siphon-jet kind, with S-trap, and various baths, sinks and bowls with mechanical traps, are vented at all. The mechanical traps shown are generally Bower's rubber-ball traps, but although these are excellent in their way, we should much prefer to have the branch-wastes with which they are connected aërated, where practicable, by back vent-pipes like the others, to say nothing of the possibility of siphonage in such traps when unfavorably placed. The open connection of the bath and basin overflows with the wastes, although usual with the Bower traps, is open to some objection on account of the opportunity which it gives for a circulation of air to and fro through this yard or so of slimy pipe and thence into the room, and the wash-tray wastes are still more exposed to the same criticism. The pantry sink presents the novelty of having, apparently, no overflow, an arrangement, which, although effectual in preventing odors from that source, might be objectionable for other reasons.

Concerning traps Mr. Gerhard's views are eminently just. We are hardly prepared to go so far with him as to say that the ordinary Boston round trap "very often" chokes up, having known but one case of the kind, and we are sure that the claim made for the Bower trap, that the elasticity of the rubber ball "allows the water in the chamber to freeze without danger of the bursting of the cup," is too sweeping, for the reason that one tested in our office burst at the first hard frost; but with these exceptions the chapter could hardly be more satisfactory.

The descriptions of apparatus which occupy most of the remaining pages of the book are as discriminating and sensible as could be desired, and are admirably and fully illustrated. The only criticism which we can make upon this portion is one to which any work on

[1] *House-Drainage and Sanitary Plumbing*, by William Paul Gerhard. Providence: 1882.

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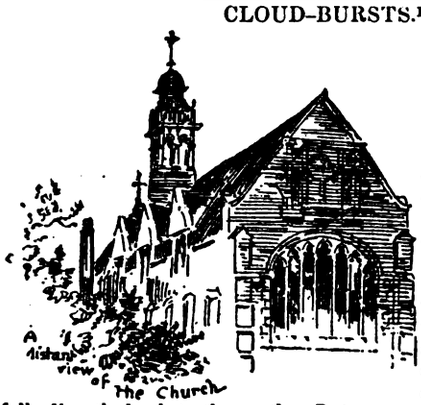
plumbing appliances becomes subject, in these progressive times, within six months after its publication, — that it is a little behind the age, omitting all mention of many forms of apparatus whose excellence has within a short time brought them into general notice. In speaking of kitchen-sinks, for instance, the author advises the use of soapstone, or galvanized or enamelled iron, which were not long ago the only serviceable varieties. Now, however, sinks can be procured, at a moderate price, of earthenware, either white or yellow, running in size up to 24″ x 48″, and presenting an appearance infinitely preferable to that of soapstone or iron, one of which gradually takes on a nauseating greasiness, while the other loses its protecting coat of zinc or enamel, and requires painting to preserve it from rust. Slop-sinks, too, for the old forms of which Mr. Gerhard proposes the substitution of an earthenware bowl with flushing-rim, set into a lead or iron hopper, are now sold in the shape which he suggests, in solid white earthenware, the upper portion of the bowl being expanded into a rectangle of considerable size, to make sure that nothing will drip over the edge, furnished with a flushing-rim of the most improved form, supplied from a cistern in the same way as the best closets.

Such little omissions as these would undoubtedly be remedied in a later edition of what is already the most complete book on the subject, so that they are in no way to be regarded as faults. The value of the work for reference is increased by the addition of tables for calculating the capacity of sewers of various sizes and laid at different grades, which will be of occasional use to architects, and of great service to engineers and landscape-gardeners.

CLOUD-BURSTS.[1]



IN order to account for the immense amount of rain which often falls in a tornado in a short time, it is necessary to have an estimate of the amount of aqueous vapor carried by the ascending currents of the interior part up through the base of the cloud into the upper regions, where it is condensed, and also of the depth of rain arising from its condensation if it all falls directly back to the earth. Let

e = the elastic force of aqueous vapor at the base of the cloud;
d = the depth of rain resulting from the condensation in the ascending current, supposing that the current extends so high that the vapor is all condensed.

Then, with an ascending velocity, u, the weight of aqueous vapor carried up per second, measured by the mercurial column, is $0.623\ eu$: 7989. Multiplying this by 13.6, the specific gravity of mercury, we get

$$d = .00106\ eu$$

for the depth of rain given by the condensation per second. With a temperature of 27° at the base of the cloud, as in our assumed example, No. 1, we have from Regnault's table, $e = .0265^m$ for the elastic force of saturated air, and with this value the preceding formula gives for an ascending velocity of 60 metres per second $d = .00168^m$ per second or 0.101^m (about 4 inches) per minute for the depth of rain, if it were to fall directly back.

Our problem is too complex, taking into account friction and all other circumstances, to determine the relation between the radial and vertical velocities; but we know that the radial component must be toward the vortex in the lower part of the atmosphere in order to supply the draught of the ascending current, and greatest very near the earth, where they are least counteracted by the centrifugal force of the gyrations. But somewhere above, it may be at a great altitude or not, according to the rate of diminution of temperature with increase of altitude in the surrounding quiescent atmosphere at the different altitudes, there must be a flowing out of the air above, so that in the ascent of the air there is an inclining toward the vortex below, and from it above. The vapor, therefore, above a certain altitude is gradually dispersed, and, if condensed into rain, it falls at some distance from the vortex of the tornado. With an ascending velocity of 60 metres per second the rain would all be carried up to an altitude where it would be carried out from the vortex, and hence none of it would fall directly back. Such a velocity would keep suspended in the air, at an altitude where the density is diminished one-half, a globe of water, if such could exist, with a diameter $D = 1.8^{em}$ (about 7 inches). With such an ascending velocity, therefore, no rain could fall directly back, but there would be an immense fall of rain around about in the vicinity, especially if the tornado in its irregular progressive motions should remain stationary, or nearly so, for several minutes over the same spot. That an ascending velocity of 60 metres per second is no unusual velocity in tornadoes, will be shown from the observed mechanical effects of tornadoes.

If the velocity of the ascending current is not so great that the rain is all carried up to where the currents are outward from the vortex, and where consequently the water is dispersed, and yet great enough to prevent its falling back, then in the whole lower part of the cloud, up perhaps to the altitude of 3,000 metres, there may be an accumulation of rain, prevented from falling by the ascending currents, and from being dispersed by the inflowing currents from all sides toward the vortex. Of course the sustaining of this water in the cloud uses up the energy of the tornado and hastens its breaking up. . . .

If we suppose that the energy of the tornado and the velocity of the ascending currents are being gradually diminished, either by the accumulation of water in the cloud, or the effect of friction, this accumulation of water may all fall to the earth in a very short time, and give rise to what is called a *cloud-burst*. This is especially liable to occur in mountainous regions; for if we suppose that a tornado heavily charged with water is moving toward the side of a mountain, its coming in contact with the mountain would interfere very much with the gyrations of the tornado and the inflowing currents below, and tend to break up the whole system almost at once, and let the whole accumulation of water drop suddenly down. Hence cloud-bursts usually occur on mountain-sides.[2]

The water in cloud-bursts does not generally fall as rain, but is *poured down*. Long before the ascending currents are so reduced as to allow the water to fall in drops it seems to collect together at certain places and force its way downward through the ascending current in a stream. This it would naturally do, since we cannot suppose that the water is ever evenly distributed over any given place, or that the velocities of the ascending currents are everywhere in the same vicinity the same. A considerable mass having been collected at certain points, it is then enabled to force its way through, and draws into its train much more from all sides on its way down, so that it may amount to a continuous stream kept up for several minutes. Of course, having once made an opening for itself, its velocity is gradually accelerated, so that on reaching the earth the velocity may become immense and the stream strike with great force. Each one of these descending streams may make a great hole or basin in the ground; and on a steep mountain-side, if the stream continues for a short time, it may give rise to a mountain slide, or at least to a great ravine, carrying rocks and trees with it down the mountain-side.

Immediately after the great tornado at Hollidaysburg, Pennsylvania, on the 19th of June, 1838, Espy visited the vicinity and examined the sides of the ridges and mountains. He found a great many holes eight or ten metres in diameter and one or two in depth, according to the nature of the soil and depth to the rock, the sides often cut almost perpendicularly down on the upper side, but entirely washed out below, so as to form the commencement of a ravine. Sometimes the current seemed to strike with so great force that it made a great hole or basin, and rebounded so as not to strike the ground again for a considerable distance. A considerable number of these holes in the earth were often found close together in the same vicinity, indicating that the water was poured down through various openings at the same time. With regard to a ridge a half-mile west of Hollidaysburg he says: "On examining the northern side of this ridge, large masses of gravel and rocks and trees and earth, to the number of twenty-two, were found lying at the base on the plain below, having been washed down from the side of the ridge by running water. The places from which these masses started could easily be seen from the base, being only about thirty yards up the side. On going to the head of these washes they were found to be nearly round basins from about one to six feet deep, without any drains leading into them from above. The old leaves of last year's growth, and other light materials, were lying undisturbed above, within an inch of the rim of these basins, which were generally cut down nearly perpendicularly on the upper side, and washed out clean on the lower. The greater part of these basins were nearly of the same diameter, about twenty feet, and the trees that stood in their places were all washed out. Those below the basin were generally standing, and showed by the leaves and grass drifted on their upper side, how high the water was in running down the side of the ridge: on some it was as high as three feet. It probably, however, dashed up on the trees above its general level." (Philosophy of Storms, p. 375.) In an account of a remarkable storm which occurred at Catskill, July 26, 1819, it is stated that "the rain at times descended in very large drops, and at times in streams and sheets." Again, another observer "particularly noticed that he could see no drops of rain; but the water seemed to descend in streams and sheets." It is evident from these, and many other similar paragraphs which might be cited, that the water in such cases is poured down in streams and does not fall as rain, especially since the lightest materials were not washed away close to the margin of these basins on the upper sides referred to above; and the reason of this, evidently, is that the accumulated water in the cloud is poured down in streams while the ascending currents are, as yet, too rapid to allow the largest drops to fall as rain.

It may be supposed by some that an ascending velocity as great as 60 metres per second is not only extremely rare, but one which

[1] From a paper on Meteorological Researches, by William Ferrel, in Appendix No. 10 of the Report of the Superintendent of the United States Coast and Geodetic Survey.

[2] This agency of mountain-sides in causing cloud-bursts was first suggested by Professor Trowbridge, of Columbia College, on hearing my explanation of the manner in which rain can be kept suspended in the cloud, in a paper on this subject read before the National Academy of Sciences, in April, 1878.

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never occurs in any tornado. This requires a barometric depression in the interior of the tornado of about 30mm. By examining column P′ in the table of § 102 it is seen that with the assumed conditions of our tornado the theoretical tension of the air near the centre nearly vanishes, and the interior becomes almost a vacuum; but of course very great allowances must be made for friction so near the centre, where the theoretical gyratory velocities almost become infinite. For since the air of the ascending current in the vortex is mostly supplied by the current near the earth, where friction is great and the gyratory velocity much diminished, this affects the gyratory velocities very greatly all the way up, so that they may differ very much near the centre from those given by (*d*), in which the effect of friction is neglected. But that the tension of the air is very much diminished in the middle of tornadoes, much more than the assumed amount of 30mm is obvious from the explosive effects often observed in the passage of a tornado. The walls of houses are thrown outward in every direction, cellar doors are burst open against the force of a hurricane wind, corks fly from bottles, and explosions occur wherever air is confined, which denote a great and sudden diminution of the outside tension of the air from the diminished pressure in the tornado, so that ascending velocities may, no doubt, be often much greater than that which would arise from a depression of 30mm only in the interior of the tornado. This may also be inferred from the powerful force of the ascending currents in sustaining and carrying in the air large and heavy bodies to a great distance. Of the many examples which might be given it is only necessary to cite one well-authenticated case: During the tornado at Mount Carmel, Illinois, June 4, 1877, we read that "the spire, vane, and gilded ball of the Methodist church were carried fifteen miles to the northeastward." Nothing is stated with regard to the material of which it was constructed, but we must infer that the ascending currents which could keep it suspended in the air for at least fifteen or twenty minutes must have had an enormous velocity. The ascending velocity required to keep a sphere one metre in diameter and of the specific gravity of water suspended in the air is 135 metres per second. On account of the probably greater surface, in proportion to the weight, in the case of the church steeple, the velocity required was perhaps much less than this, but this estimate in the case of the sphere enables us to judge better with regard to what was required in the case of the church steeple. One reason why heavy bodies are not more frequently lifted from the earth and carried up is that at the earth's surface the velocities are necessarily horizontal only, and the vertical components of velocity are naught. If heavy bodies were generally in the situation of church steeples they would be more frequently carried off. . . .

Tornadoes and water-spouts originate only in an unstable state of equilibrium of the air, which requires an unusually rapid decrease of temperature with increase of altitude. This can take place only when the strata nearest the earth are unusually heated, and this never occurs in the night or during the winter, and but rarely in cloudy weather. Tornadoes and water-spouts, therefore, take place mostly, if not always, in the summer season and during the day, when it has been clear at least a short time before their occurrence. If any agitation of the air, such as that arising from the discharge of a cannon, tends to break up these meteors, then any considerable disturbance of the air from any cause must tend to prevent their formation, and hence they do not occur when there is more than a feeble wind. This, however, does not apply to land-spouts which are formed in the interior of a tornado, having their origin in a state of unstable equilibrium in the cloud region, and commence there, but rather to water-spouts on seas and lakes, originating in a state of unstable equilibrium of the lower unsaturated strata of the atmosphere. . . .

Water-spouts and sand-spouts are *hollow*. In the case of both water-spouts and sand-spouts, therefore, if there is not an absolute vacuum of particles in the central part, the particles are so exceedingly rare there that it must be regarded as sensibly a vacuum.

The circumstances under which observations of such a vacuum can be made are very rare. M. Boué, in the year 1850, observed three water-spouts at the same time on Lake Janina, from the top of a high mountain. The weather was entirely clear, without clouds or wind, but very oppressive and hot. The spouts seemed to rise up from the lake, and he could look down into the top of them and see that they were hollow in the middle. (Bulletin Soc. Géologique de France, t. viii, p. 274.)

Of a whirlwind observed at Schell City, Mo., in the summer of 1879, Professor Nipher says: "There were no surface winds strong enough to bear dust along the surface of the ground, but the dust carried up in the vortex was collected only at the vortex of the whirl. The dust column was about two hundred feet high, and perhaps about thirty or forty feet in diameter at the top. The direction of rotation was the same as of storms in the northern hemisphere. Leaving the road the whirl passed out on the prairie, immediately filling the air with hay, which was carried up in somewhat wider spirals, the diameter of the cone thus filled with hay being about 150 feet at top. It was then observed also that the dust column was *hollow*. Standing nearly under it, the bottom of the dust column appeared like an annulus of dust surrounding a circular area of perfectly clear air. The area grew larger as the dust was raised higher, being about fifteen or twenty feet wide when it was last observed." (*Nature*, September 11, 1879.)

THE ILLUSTRATIONS.

PROPOSED DECORATIONS, STEINWAY HALL.

[From the *Building News.*]

THIS hall, seating about 600 for concerts and entertainments, forms part of the London premises of Messrs. Steinway & Sons, the well-known piano-forte manufacturers. The contemplated decorations include the clothing of the present plain piers by pilasters, the dividing up of the ceiling into panels with cove and cornice under, and the removal of the large looking-glasses, which now cover almost the whole surface of the walls, substituting the architectural features shown on the drawing. The existing colored glass in the inner skylight will be replaced by more suitable stained glass, while occupying a large proportion of the area.

RAMBLING SKETCHES BY MR. T. RAFFLES DAVISON. SOME VILLA RESIDENCES.

[From the *British Architect.*]

None of the subjects here illustrated are amongst the latest productions of their authors. In fact, so far back in the era of "revived taste" does poor "Hopefield" date, that it passed the first years of its existence under the title of "Bell's Folly." However, it bore up bravely, and the architect and owner of it has had the good fortune to sell it favorably, and another exactly like it, erected on nearly as pretty a site at Bowdon, near Manchester. And as to quality, perhaps I shall not be singular in the appreciation I have always had of these simple diagonal chimney shafts, and a general character about the house of simple unpretentiousness and picturesque design. The clever wood gate-post, worthy of mediæval times in its simple effectiveness, which I found at "Hopefield"— an inviting bay and veranda for sunny days, in Mr. Collecutt's design— a gable with gilded balls from "Fair Oak"— an effective house for its position on a corner site, by Mr. Douglas — and two or three other bits, complete this mixture of summer and winter sketches.

SIDEBOARDS SHOWN AT THE BRADFORD [ENG.] TECHNICAL SCHOOL EXHIBITION.

[From the *British Architect.*]

"CLASSICAL POESY." DESIGNED BY HERR EDMUND VON HOFFMANN.

[From the *Builder.*]

The allegorical figure of "Classical Poesy," intended for the new Burg-Theatre of Vienna, was one of the best works to be seen in the Austrian section of the International Art Exhibition held in the Vienna Künstlerhaus. The carefully executed figure testifies by its pure lines and the high standard of its conception to a not common talent. Edmund von Hoffman was born on November 2, 1847, and is consequently a young artist, who, independently of the future which is still before him, has already a remarkable past, having distinguished himself by a number of excellent works. The figure of "Classical Poesy" is intended for the central projecture of the Löwelstrasse façade of the new Hofburg theatre, its counterpart being the statue of "Romantic Poesy," also to be modelled by Hoffmann. With the figures, by Kundtmann, of Melpomene, Thalia, and Apollo, the two statues of Hoffmann's will be the largest which will adorn the new edifice. They are to be eleven feet high, and in Marzono stone, a hard limestone. The block of stone for "Classical Music" had a weight of thirty tons. Edmund von Hoffmann received his education at the Vienna Academy of the Plastic Arts, under the supervision of Professor Zumbusch, whence, having obtained the Roman Prize Stipend, he proceeded to Rome. He has executed some effective sculptures for the new Vienna Town-hall and the new University.

INTERIOR OF THE STAIRCASE OF THE CHATEAU CHATEAUDUN.

[From *Le Moniteur des Architectes.*]

A STREET IN COLOGNE, DRAWN BY MR. A. H. HAIG.

[From the *Architect.*]

HOUSE FOR W. D. BLACK, ESQ., NEAR MILFORD, CONN. MR. CARL PFEIFFER, ARCHITECT, NEW YORK, N. Y.

QUINCY MARKET COLD STORAGE WAREHOUSE, BOSTON, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

The Quincy Market Cold Storage Company's building is located on the corner of Commercial and Richmond Streets, Boston, a spur-track of the marginal railroad reaching it upon one side. The building is 80′ x 160′, and has a water-proof cellar, and four stories above, devoted to the storage of butter, cheese, meats, poultry, etc. The fifth story is nineteen feet in the clear, and is to be stored full of ice for the artificial cooling of the rooms below. The load consequently upon the ice floor will be about 1,000 pounds per superficial foot. Iron columns are placed in the cellar, and hard-pine selected posts above, those in the first story being 14″ x 14″, with iron cap and base plates, planed and fitted. The ultimate load on these posts is about 110 tons each. A very large quantity of one-inch-thick hair-felt is used in the construction and insulation of the interior of the building. All the walls are built hollow, and a portion with double air-spaces; windows are in triplicate, doors felted, and special precautions taken with rendering the roof non-conducting. Three freight elevators are provided within the packing-rooms, for the delivery of goods and also for raising the five thousand tons of ice to the upper floor each winter for the year's supply.

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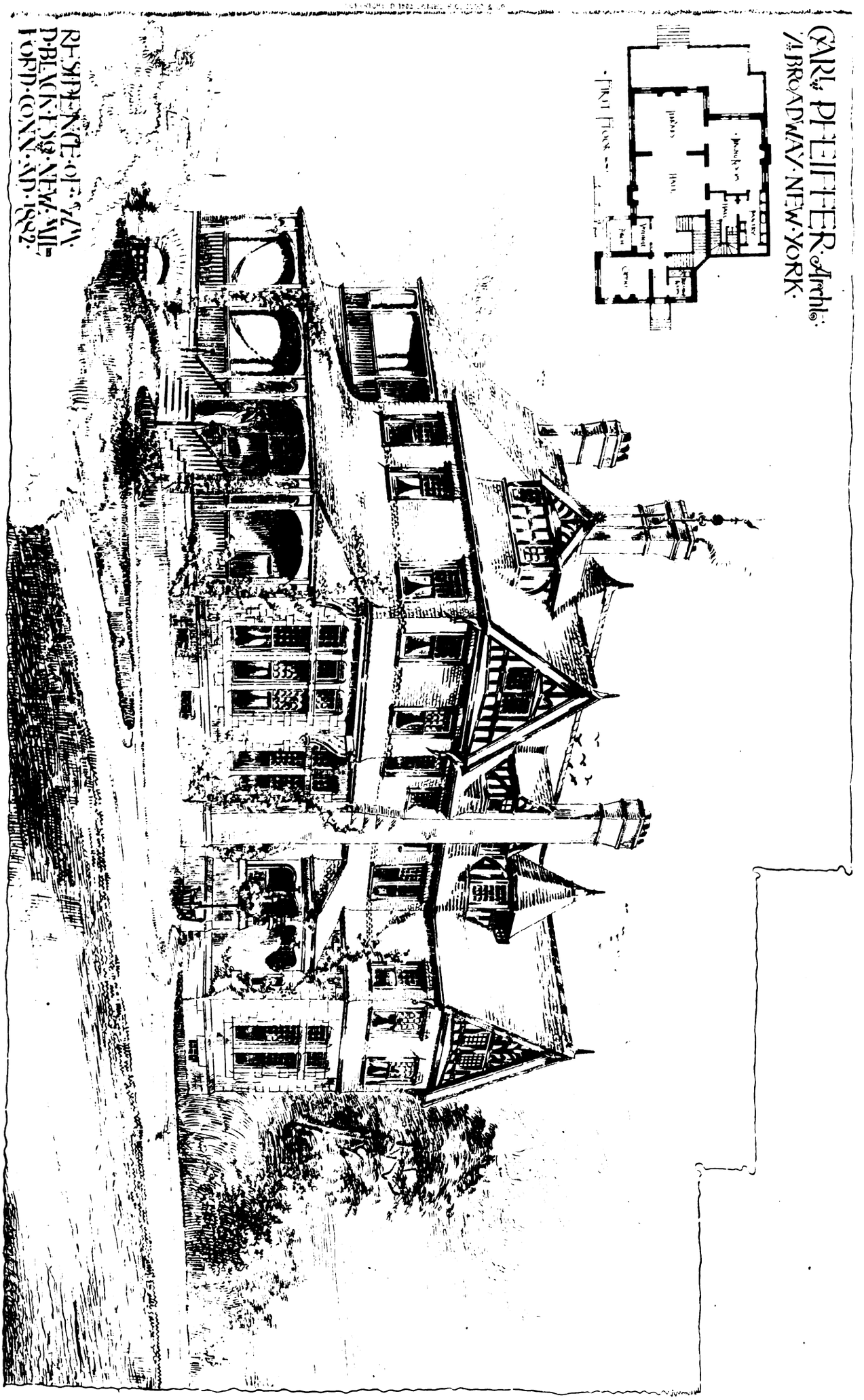

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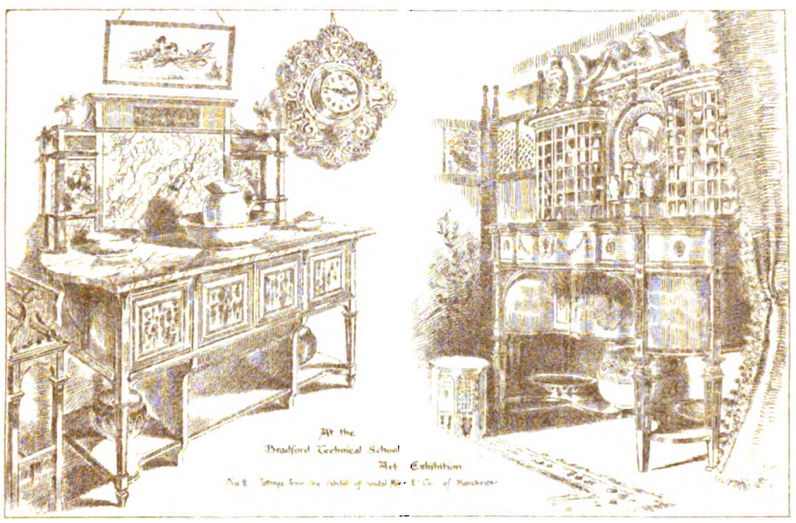
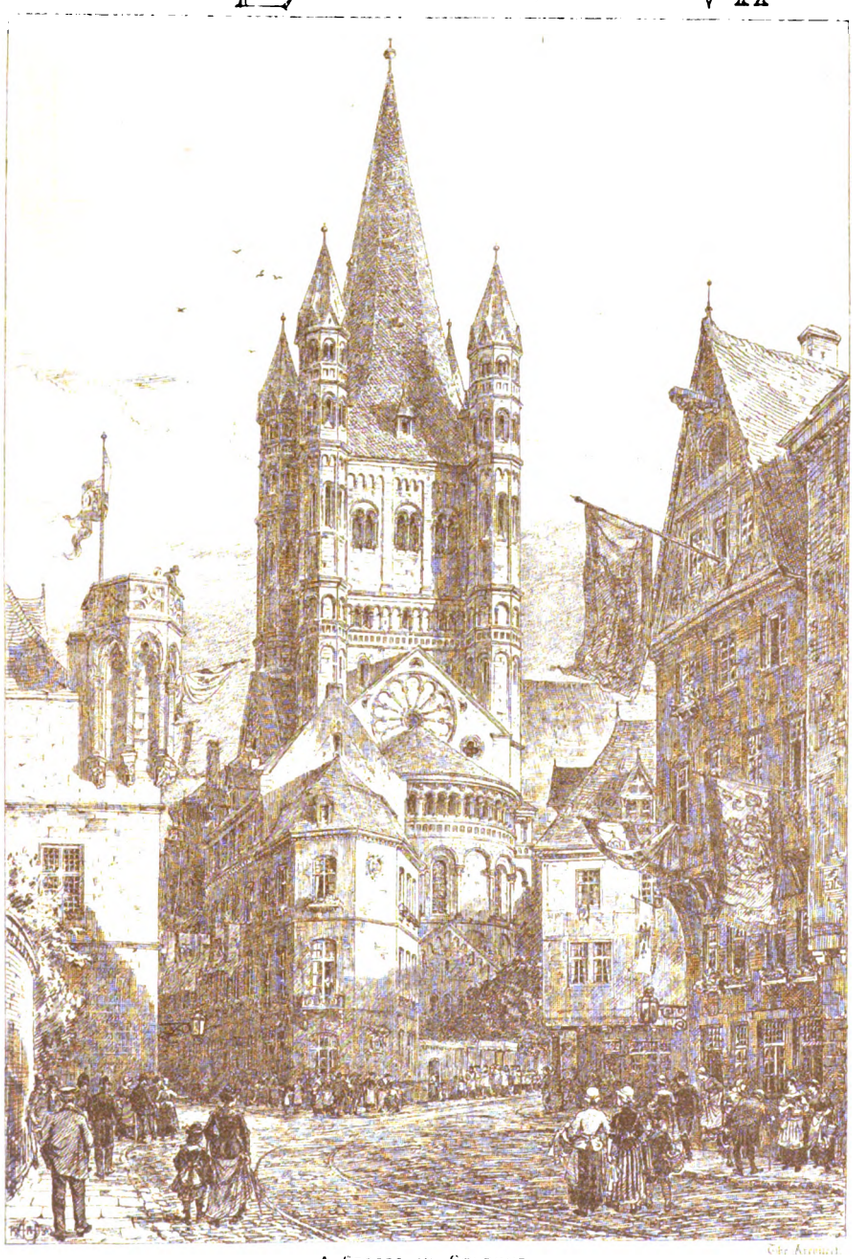
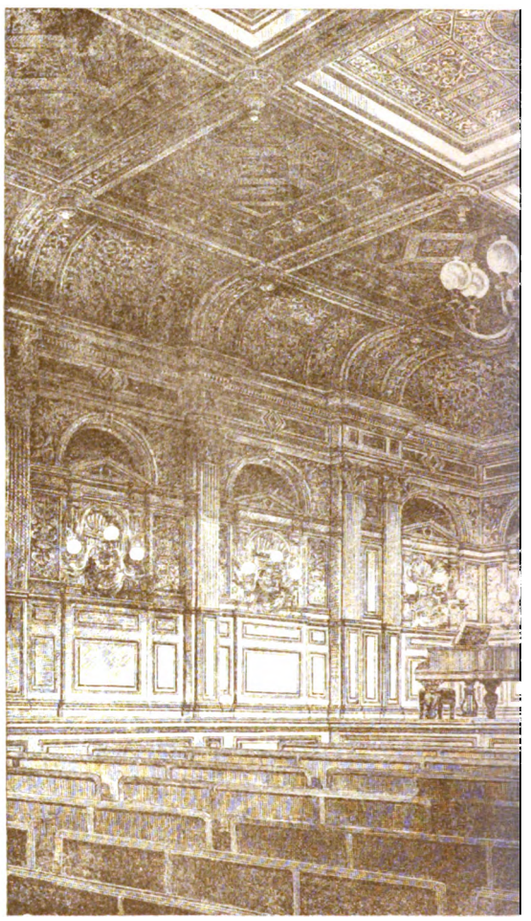


Rambling Sketches in Villa Districts. No. 24

OUR FOREIGN EXCHANGES VII.



A STREET IN COLOGNE



BUILDING NEWS

PROPOSED DECO
WAL

BRITISH ARCHITECT

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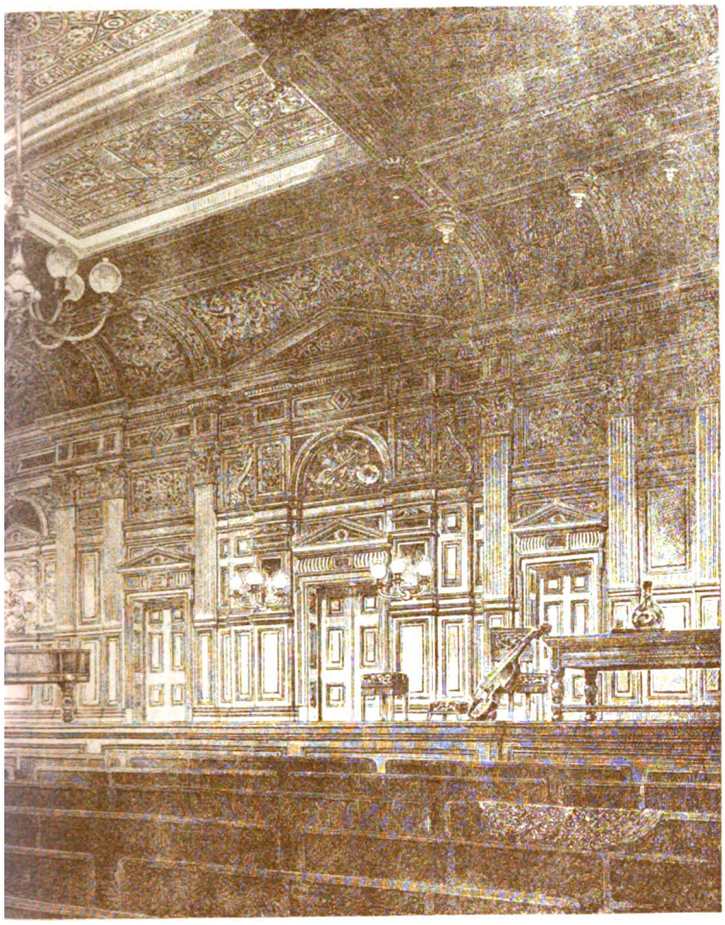
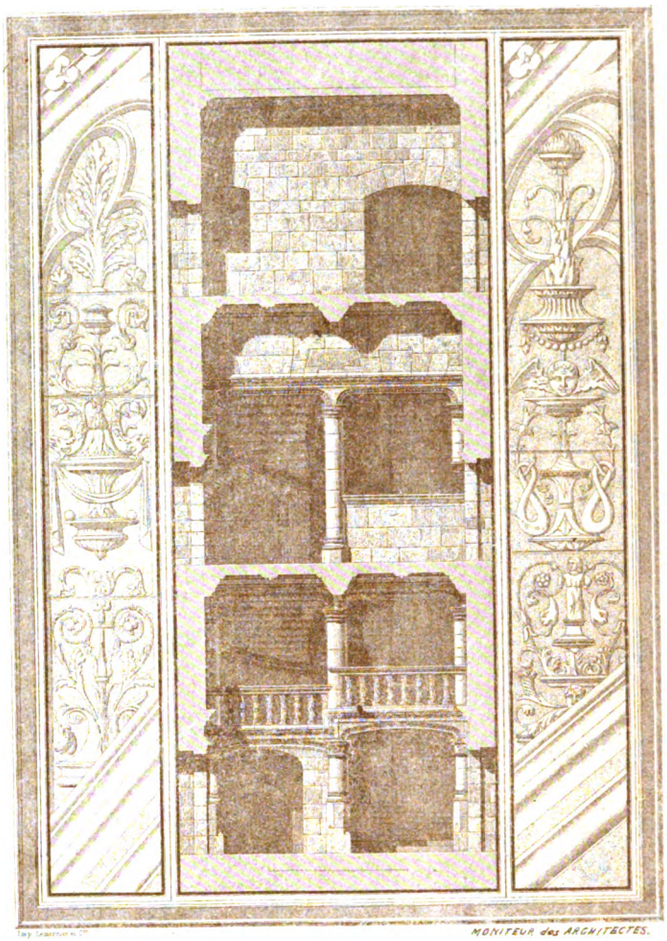


RATIONS STEINWAY HALL LONDON
ER. DENSMAN ARCHITECT



MONITEUR des ARCHITECTES.

"CLASSICAL POESY," ALLEGORICAL FIGURE FOR THE NEW BURGTHEATER, VIENNA.
MODELLED BY EDUARD VON HOFMANN. THE BUILDER.

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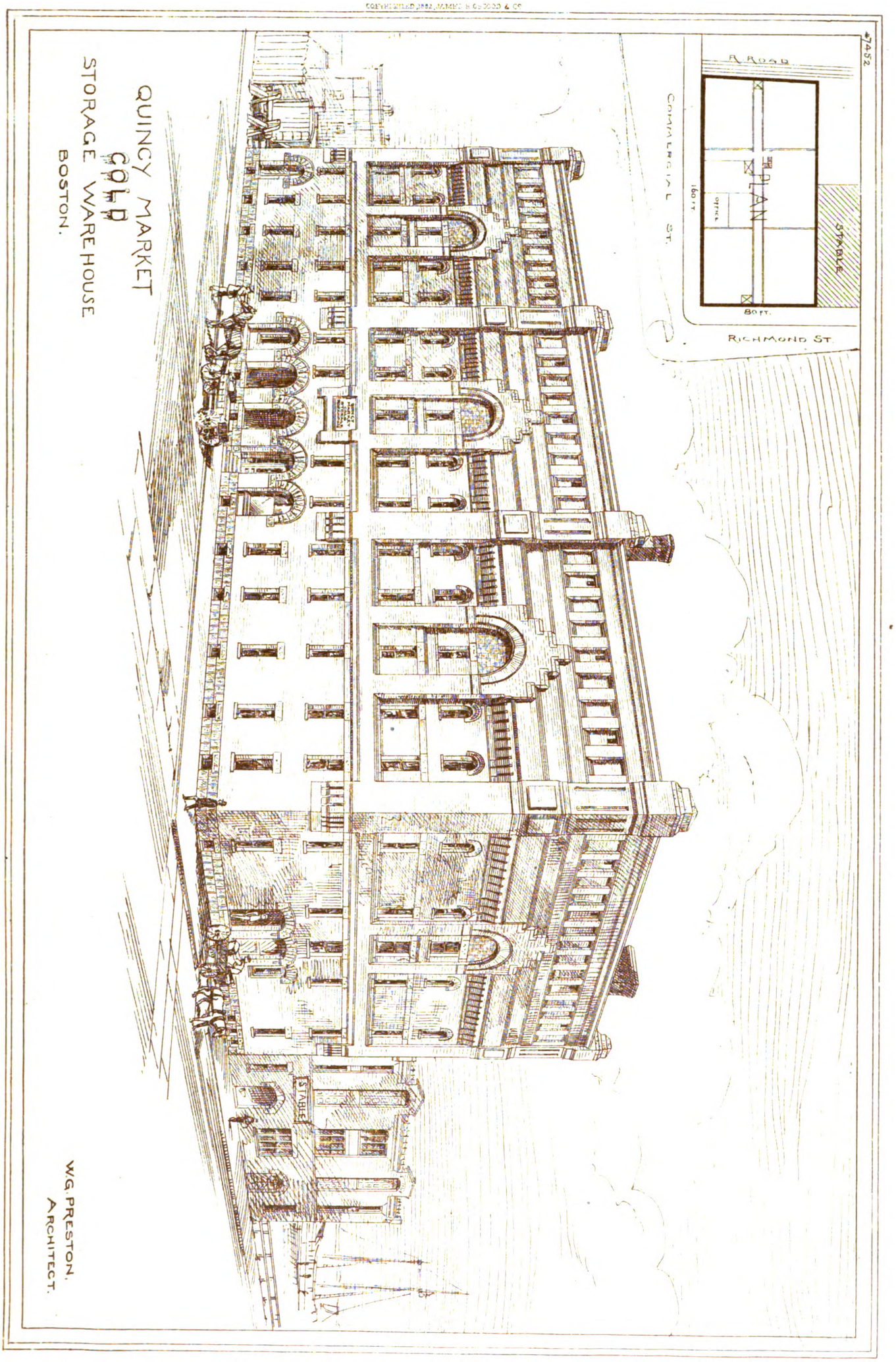

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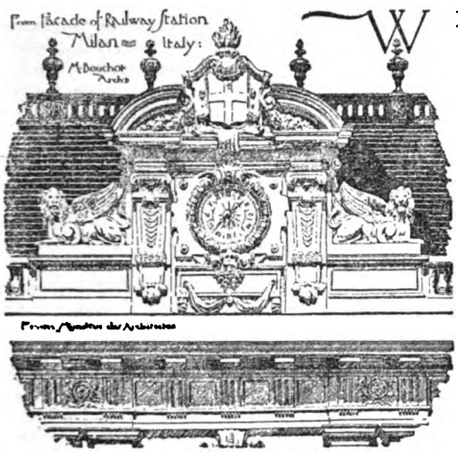
A CHAPTER ON CHIMNEYS.



WITH the exception of the Great Pyramid of Egypt (Cheops) and the spires of the cathedrals of Strasburg and Cologne, the tallest buildings in the world are chimney-stalks. Nevertheless, the interest which many may take in chimneys will most likely rest not on their size, but upon their universality, upon their commonness and usefulness. Every one, be he who he may, with whatever grand historical personages he may be otherwise connected or disconnected, has relations more or less with some chimney-stalk or other.

Chimneys are the nostrils of a house, and we know how necessary to the life of any object is the breath of its nostrils. In Chambers's "Encyclopædia" it is stated that before chimneys assumed their present form these nostrils of the house were placed at the back of the fireplace, not far above the grate; the vent or flue was short, and turned at the top towards the outside of the wall, through which the smoke found its passage in slits made for the purpose. In those Mediæval times smoke, not of cannon, might every day be observed issuing from the sides of the castle wall. Now the smoke invariably reaches the open air through perforated columns placed upon the top of the walls of the house, so that instead of looking like the nostrils of a building, the chimneys seem rather to occupy the place of ears, as on a horse's, zebra's, or lion's head. You can give expression to the look of a house by them, as in the case of the heads of these animals by the make of the ears. You can fix the character of a house by the arrangement and regulation of the height of the chimneys as much almost as by the order of the design of its front. For all that, comparatively little attention is paid to this part of the building. Up among the chimneys is the last place we look for order or classification, or even for symmetry in a land or street of houses, and when we discover the elegant and symmetrical up there we are as much surprised as when we find silver spoons in an ash-pit. It is curious to observe that while in general it is thought requisite to have the end of all towering and pointed erections finished ornamentally, the chimney-head should so frequently be left an exception to the rule. The pillar has its capital, the post its cap always, — the top concludes with a button, — the spire is invariably crowned with a gilded vane or cross, the tower has a cope and pinnacles, the top of the buttress is turned to pomegranate; the chimney-head alone, with rare but honorable exceptions, concludes, even when otherwise elegant in itself, most generally with the old time-battered, weather-streaked, familiar red tile pot or can.

Most people consider a "chimney hat" or "tile" an ugly thing on a man's head. I consider a brick an equally ugly thing on the top of a chimney-head. It is especially ugly when the wind blows it over, and it falls and hits somebody in the street.

Often these tile cans are hanging over to one side, like Willie with his wig agee. Some of them are high, some low; the more reputable are duplex, and have a long lower and short upper part; the less reputable are devoid of the top appendage; they have either lost it in scrimmages or never possessed it. Sometimes two or three are piled up in a line, and the toppling figure they form seems ever ready for decline and fall. Sometimes you observe one which has been halved by accident and which presents a broken and jagged edge to the sky. On rare occasions you may happen to come across one which has been honored by having two or three upper portions shoved over it, like the old clothesman of caricature, with his multiplicity of hats, or the fashionable lady described by Goldsmith: —

> "Skill'd in no other art was she
> But dressing, patching, repartee,
> And, just as humour rose or fell,
> By turns a slattern or a belle.
> 'Tis true she dress'd with modern grace,
> Half-naked at a ball or race;
> But when at home, at board or bed,
> Five greasy nightcaps wrapp'd her head.
> Could so much beauty condescend
> To be a dull domestic friend?"

Sometimes one stands alone like a sentry. More frequently they are found clubbed together on a stack, like a row of the awkward squad, short and tall, lean and fat, high-colored and cadaverous; some in the attitude of attention, others standing at ease, veterans of the smoke and storm in broken rank and file.

It is no doubt the case that there is a class of old-fashioned and homely buildings the chimney-heads of which the old red tile-pot suits, and which nothing else would suit so well. Let it remain and hold high holiday on the top of the thatched cottage and the country manse forever-and-a-day; but for town buildings and for all mansions that make any attempt at architectural display, the red tile is an anomaly not in keeping, and some funnel of a different pattern, if not of different materials, should be substituted for it. It is pleasant to observe that earthenware funnels of really elegant form have been introduced in some instances. There are other forms recently introduced which are not so elegant, and little bits of white or cream-colored cylinders (like elephants' toes) are among the number which I cannot admire.

To what extent, in fine, are the chimney-heads to be treated ornamentally? Should they, in the general design, be made to occupy a conspicuous or only a subordinate place? Are they just to be made passable so as to escape criticism, or are they to be made notable so that the eye may be attracted to them as an object to rest on? These are questions the architect may put to himself, and which he must answer according to his lights. It will always be safe for him, however, to put some tidy work upon them in preference to running over them in a slovenly way. When there are a number of heads to be placed on one building he should also ask whether they are to be placed at random, to suit convenience merely, or are to assume geometrical positions and be placed as the points of a mathematical figure; whether he will have them put up without due respect to the site or height of each other, or will have them arranged in order say, like the couples in a dance. I have sometimes seen an old chimney placed so awkwardly that it seemed as superfluous as a third ear on the head or a sixth finger on the hand. The chimney-heads on an elegant building should, to use as a paraphrase words intended for another subject, "possess grace and naturalness, delicacy and strength, balance and order; they should combine freshness of conception with perfect accuracy of execution, and be both familiar and sprightly."

"The chimneys of Venice," says an acute observer, "are not the least remarkable part of her architecture, and no two are alike. There are many with a slender stem of perhaps a yard in length, and calyx-like top resembling a tulip; others almost precisely like the watch-towers on the corners of ancient castle walls; others of strictly Gothic style; and some of Doric design and classical proportions. Occasionally there is one with such a slender stem and overgrown top, loaded with a redundancy of ornament, that it is the very insanity of a chimney. They catch the last rays of the setting sun and reflect the opal glories of its tints."

The head of the chimney may be said to consist of four parts: the plinth or the base, the stalk or column, the cope or capital, and the funnel or chimney-pot. The inner and concealed parts of the chimney likewise may also be said to consist of four parts: the fireplace, where the grate stands; the throat, immediately above that; the vent, or smoke-channel, which succeeds in the order of ascent; and the chimney-top, or lum-head, as it is termed in Scotch, which is the conclusion of the whole affair.

With regard to the *enceinte* of chimneys: it is better to have the chimneys of a house placed in the inner or partition walls than in the outer and carcass walls. There are two reasons for this; one is that they vent better. The hotter the sides of a chimney are the stronger the draught up it will be, and the chimney sides are kept hottest when in the inner walls of the house. The other reason is that heat is economized by having the chimneys in the partition-walls. When the chimney is in the outer wall the side towards the street or open air is generally very thin, sometimes not more than 4″ thick, and a considerable portion of heat passes through this slender side into the open air. After a shower of rain that part of the gable of a house through which the chimney runs dries more rapidly than the other parts. This shows that the heat is coming through the side of the chimney and getting out of the house. When the chimney is situated in an inner wall the heat radiates from it into the house on both sides.

Now that the practice of young sweeps riding through the chimneys is discontinued, and there is no longer any demand for projections and roughness in their interiors, to make stirrups for their little feet, the inner lining of chimneys should be smooth throughout. There should, moreover, be no abrupt turns, no knees or sudden bends, and no level reaches, but the smoke-channel should be made as easy, direct, and flowing as possible. The cross-section of that channel should never be oblong or oval, for as the smoke inclines to circle in mounting the chimney opportunity should be given to allow of it rising in this way; the cross-section ought therefore either to be round or square, or of some concentric polygonal figure.

It will not and cannot be denied that many chimneys are defective and do not fulfil their office as they should. Some smoke more regularly into the house than into the air: others have an occasional down-blast in certain acts of the wind. Some others cannot be made clean by any amount of sweeping, and when these are kitchen chimneys the auld wife's cakes are threatened with a deluge of soot and certain destruction, whenever she puts on the griddle to bake. If there comes a soft or thawing day, especially, the premonitory colliery drops never fail to come down upon the first griddleful, and splatch the cakes with black.

There are chimneys, again, which require fires like furnaces to rouse them up before they will vent at all.

Perhaps some one may remember being shown at night into a spacious but dingy bedroom, where the furniture had a pall-like

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look, and where, when the final bow was made, and he was left to himself, he saw that there was a new lighted fire in a large grate under a frowning mantelpiece. This fire, which consisted mostly of black coal, was flaring and smoking a deal, but there was little red in it. There was at the same time, he found, a cold draught moving across the room at the rate of fifteen miles an hour. The feeling of the atmosphere was raw and chill, and the visitor became shivery-shakery. The fire seemed to be drawing out the cold damp which always harbored in the corners of the apartment, and the visitor had left a room which was overheated with fire, light, and fumes. He gets into bed as quickly as he can, puts out the auxiliary light, and trusts to the company of the fire for relief. It proves but a false friend, casts a feeble light on the hangings, becomes less, but at last succumbs to that cold draught travelling across the room between the bed, and it flutters and flitters as if uncertain what to do, — flares up, and goes out.

The fact is that a fire may be drowned out by having too much cold air violently forced upon it. Fireplaces which are too large, grates which are too open, have the fault besides of allowing the air to play about everywhere but upon the point where it is wanted; blowers and newspapers held up in front of fireplaces correct this, and direct the air to the points where the fire is lighted.

When complaints are made of chimneys not venting, it should be borne in mind that the smoke goes out from the chimney-top into an uncertain, changeable, and sometimes tempestuous element. Lieut. Maury, in the "Physical Geography of the Sea," says, — "There are many abrading surfaces, irregularities, etc., which produce a thousand eddies in the main stream of the atmosphere," and also, "Each valley, every mountain range, and local district, may be said to have its own peculiar system of calms, winds, storms, etc."

Count Rumford's assertion that every chimney can be made to vent perfectly, must be taken with some deductions. It is well understood that hills, buildings, and such like large objects, in the neighborhood of a chimney, are apt to affect its venting. In certain acts of the wind they may direct the air obliquely upon the chimney, and with a dip downward, so that it is blown into the mouth of the chimney, and the smoke is driven back into the vent, like a man forced to eat his own words. Placing a slab above the mouth of the chimney may serve to correct this. Or, where the chimney and a building close to it are the same height, or nearly so, the wind which comes over the building, cutting across its ridge, comes straight and sharp as a razor along the mouth of the chimney, when it is blowing keen, slices away the smoke as it ventures out, and when blowing hard and all compact it acts like a lid, off and on, and stops the mouth of the chimney. The cure for this, of course, is lengthening the chimney and raising it considerably higher than the adjoining building.

With regard to what is called back smoke, that is, smoke from one chimney getting into an adjacent chimney, and through it into the apartment connected with the first chimney, I am told that the routine is this. When a chimney is going the draught in it is upward and skyward; but when a chimney is empty the draught is downward and houseward, the heat of the apartment in the last case causing the cold outer air to gravitate down the cold chimney. When there are two chimneys standing side by side, one of which is going, while the other is empty, the smoke from the going chimney is at times, in certain acts of the wind, blown across the mouth of the empty chimney, and being caught by the current of cold air running down that chimney, is carried with it into the apartment with which it is connected. The way to cure this and get rid of back smoke is to seal up the empty chimney. In old and frail houses, where the chimneys are shaken, back smoke may be caused by smoke passing from one chimney to another through rifts and chinks in the party-wall between them. There is no cure for this,— the disease in this case, like Mr. Pecksniff's complaint, is chronic.

It may not be out of place to sum up by stating the three approved methods of curing chimneys which do not vent well, applied by Count Rumford and all smoke-doctors since his time. The first is lengthening the chimney at the top: this increases the quantity of heated air in the chimney, and gives more power or head by increasing the difference between the weight of the air per foot, in and outside of it; the second is contracting the chimney at the throat: this increases the speed with which the heated air passes through it, and gives a heightened initial velocity to the smoke when beginning its course up the chimney. The third is when there is a deficiency of air in the apartment to feed the flame and blow up the fire, putting ventilators into the sides of the apartment, or into the windows or doors.

This imperfect chapter will indicate in a small degree how important for comfort the right construction of chimneys is, and how neatly and correctly all these parts should be built from bottom to top.— *W. Y. B. in the Builder.*

Strawberry Hill. — Matthew Arnold, in one of his "mixed essays," gives expression to the opinion that ere long the whole world will be Americanized. Events seem likely to verify the prediction. What would Horace Walpole say if he were to be told that Strawberry Hill, Twickenham, would, less than a century after his death, be purchased by an American company for the purpose of converting it into a hotel conducted upon American principles? Yet such is the fact. — *London Truth.*

FRENCH SCHOOL BUILDINGS.[1]

HE ground appropriated for the normal school shall be situated rather toward the centre of a city than toward its outskirts. It shall possess good air, be easy and safe of access, removed from noise-producing, unhealthy or dangerous establishments, and 200 metres at least from existing cemeteries.

3. The orientation of the building shall be determined according to the climate of the region, taking into account the hygienic conditions of the locality.

4. The site shall have the minimum area of a hectare (almost 2½ acres), including the courts, yards, and gardens.

5. The normal school buildings shall be used for no other purposes than those of the school proper and the cognate annexes — the primary school and nursery school.

6. The whole site shall be enclosed by a wall.

7. The normal school shall include the following departments: Administration, Instruction, Habitation, and Nourishment of the pupils, dwellings of the masters and directors, and the necessary dependencies.

12. The library of the school shall be placed near the office of the Director. It shall be arranged so as to serve as a hall of meeting for the School Committee.

The school-building proper shall include the school-rooms, class-rooms, amphitheatre for the lectures in physics and chemistry, the drawing-rooms, music-rooms, work-rooms for mechanical instruction, and, in the normal school for girls, a sewing-room.

14. The school-rooms shall be at least three in number, in schools for 60 pupils. This number may be reduced to two in those schools containing less than 60 pupils.

The rooms must be rectangular.

The area shall be calculated in the proportion of two square metres per pupil (21 square feet).

The height shall never be less than 4 metres (13 feet).

15. Three distinct class-rooms shall be provided for the three grades.

They shall, so far as possible, be adjacent but independent one of the other.

They shall be rectangular.

The minimum area shall be calculated in the proportion of 1½ square metres per pupil (16 square feet).

The height shall never be less than 4 metres (13 feet).

One of the three class-rooms shall be especially arranged for instruction in history and geography.

16. The furniture of the school-rooms shall consist of separate tables and seats for each pupil.

The table shall be fixed securely to the floor, and be provided with a drawer.

The top of the table shall be inclined like a desk, with a narrow horizontal surface at the top.

The tables and seats shall be proportioned to the stature of the pupils.

The passage reserved between two rows of tables, the passages between the walls, the *casier* and the tables shall be about 65 or 70 centimetres (2 ft. to 2 ft. 3 in.) wide.

The interval between the back of the chair and the table next behind it shall be at least 20 centimetres (8 inches) wide.

The space between the front row of desks and the wall shall be at least two metres (6½ feet) wide.

The master's platform shall be raised 30 to 45 centimetres (12 to 15 inches) above the floor, and shall contain a table and a chair.

The *casier*,[2] which is intended to contain the books of the pupils, shall be fixed against the wall fronting the master's chair. Each *casier* shall measure internally 35 x 40 centimetres (14 in. x 16 in.), and shall be 50 centimetres (20 in.) high. The compartments may be arranged one over the other.

17. The furniture of the class-rooms shall be double bench-tables.

The space allowed for each pupil shall be at least 65 centimetres (26 in.) wide.

The seat shall have a back, and its depth shall be about 35 centimetres (14 in.).

The writing tablet shall be fixed and inclined at an angle of 15 or 18 degrees.

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[1] Regulations for the construction and furnishing of normal schools published by the French Minister of Public Instruction and Religion.

[2] The *casier* can be replaced by little cupboards arranged at the right of each table, and forming a part of it.

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The passage between the rows of tables shall be about 55 centimetres (22 in.) wide, and that between the wall and the tables at least 65 centimetres (2 ft.) wide.

The space between the back of the bench and the front of the next table shall be at least 15 centimetres (6 in.).

The space in front of the front row shall be at least 2½ metres (7 ft. 9 in.) wide.

The master's platform shall be raised about 30 centimetres (1 ft.).

The wall fronting the pupils shall bear a blackboard.

18. The amphitheatre for physical and mechanical lectures shall be arranged *en gradin*.

The top of each step shall be at least one metre wide; upon them shall be the benches, with backs, and writing tables.

The benches shall be double, and the space allowed to each pupil shall be 60 centimetres (2 ft.) wide.

The passage between the rows of benches shall be 50 centimetres (20 in.) wide.

As far as possible there shall be no passage in the middle of the amphitheatre.

A free space of four metres (13 ft.) shall be reserved in front of the *gradins* for the professor's table and the necessary apparatus.

The profile of the *gradins* shall be so arranged that the visual ray of each pupil looking at the table of the lecturer shall pass above the head of the spectator placed immediately in front of him.

The height of the ceiling above the last step shall be at least equal to one-half the width comprised between the two lateral walls, the walls admitting light to the hall.

To facilitate this disposition the amphitheatre may be placed in the upper story of the building.

19. To the amphitheatre shall be annexed a cabinet for collections, a chemical laboratory for the professor, a chemical laboratory for the experiments of the pupils, a storeroom for glass-ware, and a sink-room for washing.

No communication will be allowed between the physical cabinet and the chemical laboratory.

20. The school shall be provided with a special room for instruction in drawing (sketching from the object and geometrical drawing).

This hall shall be so arranged as to accommodate pupils of two grades.

Its area shall be calculated in the proportion of 2½ square metres (27 square feet) per pupil.

A little room for the storage of models must be annexed.

21. Two or three rooms, according to the importance of the school, shall be arranged near the covered play-ground, for practice upon the cabinet-organ or piano.

22. The workshop shall be placed as far as possible from the school and the class-rooms. It shall be fitted up for working in wood and iron.

In normal schools for girls there shall be a special room for instruction in needlework.

It shall be arranged so as to receive two grades of pupils at the same time.

Its area shall be calculated in the proportion of a metre and a half (16 sq. ft.) per pupil.

24. There shall also be provided dormitories, the chambers of the overseers, shoe-rooms, linen-rooms, infirmary, kitchen, dining-rooms, bath-rooms, and laundry.

25. Dormitories shall never contain more than 30 beds.

They shall be lighted and aired by means of windows fronting each other and pierced in the longitudinal walls.

The height shall be at least 4 metres (13 feet), the depth about 7½ metres (24 ft. 4 in).

They shall have a wooden floor.

The space between the beds shall be at least one metre wide.

The windows shall be rectangular casement windows.

The window-stool shall be one metre and ten centimetres (44 in.) above the floor.

The beds shall be separated by movable curtains.

The wash-bowls shall be in an adjoining room.

Each dormitory shall have a coat-room.

26. The chambers of the overseers shall be arranged at the extremities of the dormitory, with a glass door permitting them to see all the beds.

The servants' chambers shall be near the chambers of the overseers.

27. A large room fully ventilated shall be provided on the ground floor for shoes, which shall be arranged in open pigeon-holes in the middle of the room.

28. The linen-room shall be divided into three parts: one for the storage of linen, arranged with open cupboards, one for the mending and ironing, and the third for the sempstress in charge of the department.

A special room for soiled linen shall be arranged within easy reach of the linen-room.

29. The infirmary shall contain a common chamber, two isolated chambers, a room for the hospital attendant, a cabinet for consultation and medical supplies, a room for the preparation of herb-tea, a bath-room and water-closets.

The infirmary shall, so far as possible, be a distinct and isolated pavilion.

In any case it shall be separated from the other portions of the school.

It shall be easy of access, and occupy the healthiest and most favorably exposed position, sheltered from the noise of the court-yard and the movements of the pupils.

The common room shall be calculated in the proportion of one bed for every twenty pupils, and shall contain about 35 to 40 cubic metres for each invalid in the room.

The nurses' rooms shall be placed between the common room and isolated chambers.

30. The kitchen department shall contain the kitchen proper, a scullery, a servants' hall, a wine-cellar, a fruit-room, a cellar for provisions, and a fuel room.

The kitchen may be placed in the basement if it is sufficiently high and well ventilated. In this case it must be put into communication with the dining-room by means of a dumb-waiter.

Apparatus for the heating of the baths must be provided.

A chimney-shaft for exhausting the bad air and odors must be provided.

The area of the dining-room must be calculated in the proportion of 1½ metres (16 sq. ft.) per pupil, must be perfectly ventilated and lighted, the floor laid in tile or brick, and the part under the tables provided with a carpet or movable flooring.

The table-tops must be of hard wood or enamelled iron or marble.

There must be a special table for the masters.

A china-closet must also be arranged near the dining-room.

32. The number of bath-rooms must be calculated in the proportion of one bath to every 10 pupils.

Each bath-room must be lighted direct from the outside, and must be separated from neighboring bath-rooms by a partition two metres high.

The floors shall be tiled or laid in cement, and provided with an outlet for water.

A mat or grate of wood or cork shall protect the feet of the pupil from contact with the tiles.

The walls and partitions shall be painted in oil paint.

There shall be a special room for foot-baths, and a cabinet for *douches*.

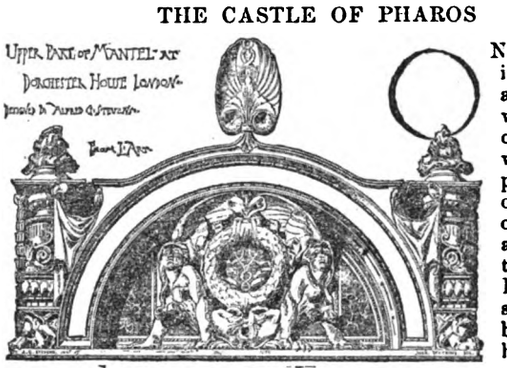
The room for foot-baths may contain at the same time one-third of all the pupils in the school.

These baths may be of stoneware or of metal.

The cabinet for the *douches* shall be preceded by a small dressing-room.

38. The laundry shall be in an outhouse or in an annex in the courtyard.

THE CASTLE OF PHAROS



ONE of the buildings destroyed at Alexandria was the castle of the Pharos, which was practically the only specimen of Arab mediæval architecture in the city. It stood on the site of the celebrated light-house, by the ancient name of which it was still commonly known. Mr. H. C. Kay says that being at Alexandria in the spring of last year he desired to visit the building, and was fortunate enough to obtain permission to do so, which for a long time past has been rarely granted. His object, apart from motives of interest in the old building itself, was to ascertain, if possible, whether any signs could be discerned of its having been erected on the actual foundations of its more ancient and renowned predecessor. Mr. Kay's inspection was necessarily a very superficial one, but as far as it could go it confirmed him in the belief that some such indications are actually to be detected, and he noticed in a particular spot, near one of the corners of the building, where the wall could be perceived to run in a direction not widely but distinctly different from that of the presumably original foundation, with which it formed a gradually divergent angle. The Pharos was still in existence in A.D. 1326. It became a complete ruin between that date and A.D. 1349. The present building was erected by the Egyptian Sultan Kait-Bay, who reigned from A.D. 1468 to 1496. It may readily be presumed that, according to the uniform practice of the East, the ground continued until that time encumbered with the ruins of its predecessor. The name and title of Kait-Bay were imperfectly but unmistakably legible on one of two much decayed limestone tablets over the entrance gate. The latter was roughly formed by three massive blocks of granite, two of which, standing erect, served as jambs on either side, with the third forming a lintel across the top, the whole presenting a peculiarly Egyptian appearance. A wide passage, turning at an abrupt right angle to the left, gave access to a small mosque, consisting of an hypæthral court, with four arched recesses, one of which contained the kiblah and pulpit. The slight deviation of the walls of the castle from the lines of the ancient foundations may possibly have been made for the express

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purpose of placing the mosque in the true line of direction towards Mecca.

The mosque composed but a very small portion of the building. The remainder, rising one story above the other, was occupied by innumerable rooms of various sizes, opening out of long and narrow passages, all empty and for many years apparently disused. Mr. Kay was informed that it was capable of lodging 5,000 men — a statement which was probably not exaggerated. The quarters intended for the commander and other superior officers were easily distinguishable by their superior look, and by some scanty remains of decoration and of ancient mosaic flooring of colored marbles.

On the flat roof rose a somewhat ruinous minaret, the upper portion of which had disappeared, but which contributed much to the picturesqueness of the massive square building, which, with its rounded towers at each of its four angles, formed so conspicuous a feature in the view of Alexandria, on its eastern side, both from the land and from the sea.

It is, of course, highly improbable that the castle will be rebuilt. We must, on the contrary, expect that its shattered fragments will speedily be removed. But it is to be desired that this may not be done without the presence of some competent person, able to ascertain, with some degree of precision, whether anything be really still in existence of the last remains of the widely-celebrated monument that once stood upon the spot.—*The Architect.*

NOTES AND CLIPPINGS.

An Old Stove. — One of the oldest stoves probably in the United States is the one that warms the hall of Virginia's Capitol in Richmond. It was made in England and sent to Richmond in 1770, and warmed the House of Burgesses for sixty years before it was removed to its present location, where it has remained for thirty years.

A Welsh Cure for the Ague. — Being in the new church of Aber, Carnarvonshire, lately, I was looking at the old font, brought from the ancient church there when it was demolished to make room for the present new edifice, and noticing four circular hollows on the rim, suggested that the ancient cover or canopy of the font probably sprang from them or fitted into them. "Nay," said the venerable rector; "my people say that they were caused by scraping away the stone; dust from the church font mixed in water and drunk early in the morning being considered a cure for the ague." — *Notes and Queries.*

Cooling Apparatus. — A new method of cooling rooms by what may be termed a chemical lung, or punkah, might prove useful in India and other tropical countries. The following is a description of the apparatus: Attached to the frame of the punkah is an endless blind, passing round rollers at the top and bottom. The bottom roller is a trough, which contains a solution of a caustic alkali. At every swing of this punkah a wheel and ratchet arrangement causes the rollers to revolve, thus drawing the sheet or blind through the solution. The wet sheet swinging to and fro takes up from the air the sulphurous and carbonic-acid gases, as well as some organic matter. Brought to the test of experiment, this plan appears to work successfully. In a small room, 15′ x 18′, and only 8′ high, fifty jets of a gas stove were set burning for an hour, with the windows and doors of the room closed, and to make it still further unfit for animal life, a quarter of an ounce of sulphur was burnt in it. The punkah, charged with caustic soda, was here set to work, and in ten minutes the temperature was reduced from 85 degrees to 70 degrees, and the air was made sufficiently fresh and pleasant for twenty persons crowded in the room.

London Parks. — The public parks in London maintained by the Metropolitan Board of Works, not including the royal parks and a few open spaces on the outskirts of the metropolis, contain 1,670 3-4 acres, distributed as follows: Finsbury Park, 115; Southworth Park, 63; gardens on the Victoria, Albert and Chelsea embankments, and in Leicester Square, 14; Blackheath, 276; Hampstead Heath, 240; Shepherd's Bush Common, 8; London Fields, 27; Hackney Downs, 50; Well-street Common, 30; North Mill Field, 29; South Mill Field, 28; Clapton Common, 9 1-4; Stoke Newington Common, 5 1 2; waste land at Dalston Lane and Grove Street, Hackney, 1; Tooting Beck Common, 144; Tooting Graveney Common, 63; Clapham Common, 220; Bostail Heath, 55; Plumstead Common, 110; Shoulder-of-Mutton Green, 4; Wormwood Scrubs, 194.

The Statue of Liberty. — A few days ago M. Bartholdi, the designer of the colossal statue of "Liberty Enlightening the World," which is to be erected near New York in commemoration of the American War of Independence, entertained a party of his friends at luncheon. The table was laid in the lower folds of the drapery of the figure. MM. Gaget, Gauthier & Co., of Paris, the contractors for the erection of the statue, have been obliged to take a plot of ground adjoining their foundry, and covering 3,000 square metres, upon which the scaffolding has been fixed. The interior of the statue contains an iron backing, to which are attached the exterior parts, consisting of bronze plates, about one-tenth inch thick, by four feet seven and one-half square — the largest size made in the trade. The plates are kept together by rivets that are invisible from the outside. The plates of bronze are made to correspond with the contours of the model in an ingenious way. A skeleton of fine wickerwork was first formed, and this was covered with a thick coat of plaster moulded to an exact reproduction of the original. Upon the plaster six-inch templates of thin wood are adjusted, and are then given to the bronze-workers for models. The weight of the figure will be about 150 tons; the height from head to foot about 110 feet, and from the end of the torch raised in the right hand to the feet, 140 feet. The cost of execution will exceed £28,000, and the work will require five years for completion.—*The Architect.*

The Escambia Bay Bridge. — The Pensacola and Atlantic Railroad bridge over Escambia Bay, two miles and a quarter long, was finished August 15, at noon, and trains passed over it at one o'clock.

A Fire-proof Roofing. — A German paper says that a roof can be made fire-proof by covering it with a mixture of lime, salt, and wood ashes, adding a little lamp-black to give it a dark color. This not only guards against fire, it is claimed, but also in a measure prevents decay.

The Temple of Diana at Ephesus. — At a London meeting to raise money to complete the excavations at Ephesus, Mr. Wood, the explorer, told how he discovered the famous temple. No writings existed to afford him the slightest clew to the whereabouts of this wonder of the ancient world; but he hit upon an inscription from the wall of that theatre to which St. Paul would have entered, but "the disciples suffered him not." This described a procession in which certain images were carried from the temple through the city gates. After much search he found the gates, and then at length hit upon the paved way, worn into grooves by the wheels of chariots. Little by little he made progress at the City of Ephesus until he reached the temple of the great goddess Diana. The fragments of friezes and column drums give a glimmering idea of what the whole must have been. They are now in the British Museum.

A Natural Ball-Room. — About a mile from the market town of Adelsberg in Austria, and three miles from Trieste, is to be seen the most wonderful cavern in Europe, and possibly in the world, called the Adelsberg Cave, and which has been explored for a length of nearly 3,000 yards, as far as a subterranean lake. This cavern consists of several grottos from sixty to eighty feet high. The interior resounds with the noise of water, as a little river runs completely through it, forming many cascades on its way, and being finally lost to view in a fissure. This river continues its subterranean course for about eight miles; and after a time, it disappears into the caverns of Laase, whence it emerges as a navigable river called the Laibach. The entrance to the cave of Adelsberg is illuminated by hundreds of candles, and a transparent curtain, composed of large sheets of crystallized limestone, is seen hanging from the roof. The vast hall or ball-room is about 180 yards from the entrance. It is 300 feet long, and 100 feet high, and is adorned with transparent stalactites of every kind of fantastic shape and form. Until the year 1819 this ball-room was the only part known; but at this date the wall of stalagmite was broken through, and a series of chambers exposed to view possessing a cathedral-like appearance, from the stalactites in many instances forming vast columns, by meeting the stalagmites below. In the Adelsberg Cavern numerous specimens are found of the proteus, a kind of lizard that dwells in the bottom of cavern-lakes. — *Chambers's Journal.*

The Atkins Water-Softening Process. — The important question of the softening and purifying of hard water in bulk has received a satisfactory solution in the Atkins process, which promises to be of great public service in these respects. The process is a modification of, and an improvement upon, the Clark system of softening water, which consisted in adding lime to the water to be softened, and allowing the mixture to stand for twenty-four hours in large reservoirs or precipitating tanks before it could be used. In the Atkins process, however, the precipitating tanks are dispensed with and the water can be used as it is softened, the process being continuous and no time being required for it to stand and settle. The process essentially consists in chemically purifying the water, instead of mechanically as in ordinary filtration. In practice a small jet of lime-water is introduced into a portion of the water to be softened and the two are blended in a mixer, whence they flow into a softening tank, into which the bulk of the water is conducted. From this tank the water with the lime in suspension flows into the Atkins rotary disk filters, in which the solid particles are all arrested by an ingenious system of cloth-covered disks placed within a tank, and which present a very large area for filtration within a very small compass. The purified and softened water is conducted from the filters to the storage reservoirs ready for use. The effect of the lime-water is not only to purify and soften the water in bulk, but to cause any clayey matters that may be held in suspension to coagulate, thus facilitating their removal. The water passes from the outside to the inside of the filters through the cloth-covered disks, the surfaces of which become in time coated with a deposit consisting of carbonate of lime and impurities. These surfaces are quickly cleaned by means of a series of brushes which are brought into contact with the disks. The brushes, which are fixed on a spindle, are rapidly revolved, as are also the disks, but in opposite directions, the result being that in a few minutes the filters are cleansed and ready for work again. The system has been successfully applied to private water-supplies in several instances, notably at the residence of the Duke of Richmond at Goodwood, and at that of Mr. W. H. Smith, Member of Parliament, near Henley. The first application of the system to a public water-supply is that of the Henley-on-Thames Water-Works, which were recently opened. It was introduced there by the engineer to the water company, Mr. Jabez Church, in consequence of the extreme hardness of the water which is to be obtained from the chalk, and is normally of about nineteen degrees of hardness. After treatment however by the Atkins process the hardness is reduced to nearly four degrees, which means a beautifully soft water. The apparatus is calculated to soften and purify rather more than 100,000 gallons of water per working day of ten hours. The softening apparatus was supplied by the Atkins Water-Softening and Purifying Co., of No. 62 Fleet Street, London. The system has been tried on the London & Brighton Railway by Mr. Stroudley, the Locomotive Superintendent, who is having an apparatus put up to soften and purify between 300,000 and 400,000 gallons of water per day for the supply to the boilers at the company's locomotive and carriage works at Brighton. The practical value of the system is therefore established as regards the treatment of waters containing the carbonate of lime. — *London Times.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

262,557. DOOR-CHECK. — Richard H. Barnard, Chicago, Ill.

262,558. APPARATUS FOR DRYING LUMBER, ETC. Alvin W. Barry, Corry, Pa.

262,569. PILE. — Henry Case, Brooklyn, N. Y.

262,583. BRICK-MACHINE. — Edward Fales, Keokuk, Iowa.

262,603. MANUFACTURE OF ARTIFICIAL MARBLE, STONE AND TILE. — John W. McKnight, Washington, D. C.

262,611. LATH-TRIMMING MACHINE. — George W. Nichols and William Taylor, Clinton, Iowa.

262,614. BRICK-KILN. — Stephen James Plant, York, Ontario, Can.

262,618. LOCK. — James Roach and Patrick W. Salmons, Terryville, Conn.

262,627. FIRE-ESCAPE. — William H. Souther, San Francisco, Cal.

262,671. SWINGING URINAL. — Clara E. Hooke and George D. Scott, New York, N. Y.

262,698. HANGING SAWS. — Walter H. Sawyer and Rufus J. Phelts, Fort Valley, Ga.

262,714. DOOR-HANGER. —William H. Wilder, Caledonia, N. Y.

262,715. STEAM HEATER OR RADIATOR. — Edwin A. Wood, Utica, N. Y.

662,730. FIRE-EXTINGUISHER. — Robert Briggs, Brooklyn, N. Y.

262,776-777. AUTOMATIC FIRE-EXTINGUISHER. — Charles L. Horack, Brooklyn, N. Y.

262,780. NAIL. — John Hyslop, Jr., Abington, Mass.

262,783. HATCHWAY-DOOR OPERATING MECHANISM. — Ernst August Jacobs, Chicago, Ill.

262,789. SHUTTER-WORKER. — William Kaufman, New York, N. Y.

262,801. CONNECTING THE WASTE-PIPES OF BUILDINGS WITH SEWERS. — Charles A. Loretz, Brooklyn, N. Y.

262,826. STEAM-RADIATOR. — William H. Page, Norwich, Conn.

262,837. FIRE-ESCAPE. — Philip S. Scovel, Bordentown, N. J.

262,840. WRENCH. — Richard Simmons and William Tyack, Beacon, Mich.

262,859. HAND-SAW. — John E. Tyler, Roxobel, N. C.

262,860. SEWER-FLUSHING APPARATUS. — William H. Vibbard and George H. Chandler, Kalamazoo, Mich.

262,861-862. SAFETY ATTACHMENT FOR ELEVATORS. — Frederick W. Voerde, Chicago, Ill.

262,885. REAMER. — Jabez K. Babcock, Phelps, N. Y.

262,887. COMBINED FIRE-ALARM AND FIRE-EXTINGUISHER. — Charles E. Buell, New Haven, Conn.

SUMMARY OF THE WEEK.

Atlanta, Ga.

BUILDING PERMITS. — The following list of buildings now in course of erection in this city and vicinity are being built according to the drawings and specifications of Messrs. Bruce & Morgan, architects, Atlanta: —

Jos. E. Brown, block of stores, brick and galvanized iron, 72′ x 120′, on Alabama St.

W. W. Simpson, stores, brick and galvanized iron, 44′ x 165′.

Capt. N. D. Grant, stores and boarding-house, brick and galvanized iron, 75′ x 185′.

Brick court-house on Hunter St.

Messrs. Adair & Alexander, brick store, 25′ x 185′.

Baptist Church, brick parsonage.

Trinity Church, brick parsonage.

Colored school, two-st'y frame building, 60′ x 70′.

Walker-street School, frame building, three-st'y addition, 40′ x 60′.

Residences for A. A. Shields, W. L. Traynham (2), Dr. H. H. Tucker (2), J. C. Kimball, F. G. Hancock, J. P. Manley, A. P. Adair, A. G. Howell, Col. L. M. Terrell, and W. A. Heath (3); all of wood.

Mrs. Kirbey, brick boarding-house, 50′ x 120′.

G. W. Adair, brick tenement-house.

T. N. Hall, brick residence.

The following are being erected for the clients of Messrs. J. Moser & Lind, architects: —

Smith Building, two-st'y dry-goods store, brick and iron front, 42′, on Whitehall St.

Capt. Henry Jackson, five-st'y brick, stone and iron building, 50′ x 100′, for stores and offices, cor. Alabama and Pryor Sts.

Atlanta Street Car Co., brick street-car shed, 140′ x 150′.

Meakin, brick residence, McDonough St.

Convent of the Immaculate Conception, Loyd St., additions, consisting of a third story and repairs.

Peter Lynch, 2 frame residences, on Foster St.

Col. B. H. Wilson, frame residence, West End.

St. Phillip's Church, cor. of Washington and Hunter Sts., brick and artificial stone building.

Gordon Residence, frame building, on Peachtree St.

The following buildings are being erected by Messrs. Fay & Eichberg, architects: —

Addition to C. J. Weinmeister's hotel.

Messrs. J. J. and M. L. Tolberts, storehouse.

Messrs. Langston & Crane, cotton warehouse.

A. Dittler, storehouse.

J. C. Peck, storehouse.

T. M. Cunningham, storehouse.

Messrs. Treadwell, Armistead & Co., cotton warehouse.

W. P. Inman, cotton warehouse.

Remodelling State Capitol.

Residences for M. Wiseberg, T. L. Langston, Jacob Haas, Moses & G. Kleinert; all of brick.

Additions to the residences of Messrs. George W. Harrison and Jas. H. Low.

Cottages for Messrs. H. C. Stockwell (2), Mrs. Pledger (8), J. Menko, A. Rosenfeld, Samuel Weil, Mrs. Down (2), J. M. Couper, and Jacob Haas (13); all of wood.

The following buildings are being erected by Messrs. Humphrys & Norrman, architects, Atlanta:

Gate City National Bank, five-st'y building, basement and first story of Chicamauga stone, other stories pressed brick with Ohio freestone trimmings, 59′ x 161′.

Atlanta University, three-st'y hall, pressed brick and Alabama stone, 160′ x 200′.

St. Luke's Episcopal Church, half timbered, Queen Anne style, 50′ x 100′.

Mr. Millidge, 3 tenement-houses under one roof.

Messrs. D. U. Speer and Julius L. Brown, brick dwell.

Messrs. R. D. Spalding, M. D. Ellis, C. J. Swift, John Millidge, and J. B. Davis.

Baltimore.

DWELLING. — Mr. George Archer, architect, has completed drawings for a dwelling for Mr. Charles D. Fenhagen, to be built on N. Broadway, 25′ x 82′, three stories and back building; to be built of brick with marble finish; cost, about $7,000.

BUILDING PERMITS. — Since our last report eleven permits have been granted, the more important of which are as follows: —

Wesley Church Mission, three-st'y brick building, in rear of n e cor. Eden St. and Western Ave.

H. Classen, 4 two-st'y brick buildings, Charles St., s of Wells St.

John Masson, 5 two-st'y brick buildings, Washington St., beginning at s e cor. of Eager St.

John Masson, 12 two-st'y brick buildings, Eager St., between Washington and Castle Sts.

John Masson, 9 two-st'y brick buildings, Eagle St., between Castle and Chester Sts.

John Masson, 7 two-st'y brick buildings, Chester St., beginning at cor. of Eager St.

Patrick Bradley, two-st'y brick carriage-house, Wilson St., w of Druid Hill Ave.

Boston.

BUILDING PERMITS. — *Brick.* — *No.* 318 *Beacon St.*, Ward 11, for Henry A. Hildreth, stable, 24′ x 31′; N. B. Clapp, builder.

Hawkins St., near Chardon St., Ward 7, for City of Boston, mechanical, 46′ x 48′; J. S. Jacobs, builder.

Wood. — *Unnamed St.*, near Everett St., Ward 25, for Henry W. Longfellow, two-st'y stable, 35′ x 57′; H. M. Perry, builder.

Sumner St., near Gulliver Ct., Ward 24, for Henry L. Batchelder, stable, 20′ x 24′; F. W. Webster, builder.

Roslin St., rear, near Harbey St., Ward 24, for Chas. C. Dunbar, two-st'y stable, 25′ x 32′.

Westerley St., near Western Ave., Ward 25, for James Brown, two-st'y dwell., 21′ 6″ and 26′ x 30′; Christopher Leake, builder.

Ashford St., opposite Chester St., Ward 25, for Isaac Pratt, Jr., two-st'y dwell., 26′ and 34′ x 38′; D. J. Cameron, builder.

Southwood St., near Blue Hill Ave., Ward 21, for J. C. & E. A. Loud, three-st'y dwell., 23′ 6″ and 32′ 6″ x 49′ 6″.

Centre St., near Highland St., Ward 21, for Horace B. Sargent, Jr., three-st'y dwell., 20′ x 36′; Richardson & Young, builders.

Centre St., cor. Highland St., Ward 21, for Horace B. Sargent, Jr., and L. M. Sargent, three-st'y dwell., 21′ x 36′; Richardson & Young, builders.

Savin Hill Ave., near Robinson Court, Ward 24, for Jesse Mann Duncan, two-st'y dwell., 18′ x 30′.

Unnamed St., near Brooks St., Ward 25, for Edward Revett, three-st'y dwell. and manufactory, 25′ x 30′ and 17′ x 50′.

K St., *No.* 197, Ward 24, for Morton W. Wyman, two-st'y mansard dwell., 22′ x 30′.

Farnham St., cor. Gerard St., Ward 20, for Globe Chemical Co., storage, 30′ x 40′.

Smith St., near Phillips St., Ward 22, for Jeremiah O. Sullivan, three-st'y dwell., 27′ x 31′; Samuel Rantin, builder.

Gerard St., cor. Howard St., Ward 20, for Thomas F. Scanlon, stable, 40′ x 40′; Andrew Anderson, builder.

Whitney St., near Tremont St., Ward 22, for John F. Burns, 2 three-st'y dwells., 25′ 6″ x 26′ 6″; Samuel Rantin, builder.

Rockland St., nearly opposite Wakulla St., Ward 21, for J. V. N. Stults, 6 three-st'y dwells., 20′ and 21′ x 40′; Benj. F. Bean, builder.

Brooklyn.

BUILDING PERMITS. — *Warren St.*, s s, 130′ w Hicks St., four-st'y brick building for "Church Societies;" cost, $7,000; owner, J. Fransioli, 111 Warren St.; architect, A. Pauli; builder, J. F. Nelson.

Green Ave., n s, 400′ w Reid Ave, 8 three-st'y brick dwells.; cost, each, $2,500; owner, Patrick Barrett, 68 Underhill Ave.; architect and carpenter, C. B. Piper; mason, J. Barrett.

Court St., e s, 50′ 6″ n Bergen St., four-st'y brick tenement; cost, $12,000; owner, John H. Newman, 181 Court St.; architect, T. F. Houghton; builders, F. Curren and F. G. Turner.

Raymond St., n e cor. Willoughby St., rear, five-st'y brick factory; cost, $2,500; owner and carpenter, F. G. Smith; mason, C. Cameron.

Lefferts Pl., n s, 360′ e Grand Ave., three-st'y freestone dwell.; cost, $6,000; owner, architect and builder, Benjamin Liniken, 216 Greene Ave.

Hart St., n s, 100′ e Tompkins Ave., two-st'y brick dwell.; cost, $4,000; owner, architect and builder, S. Phillips, 691 Lafayette Ave.

Hancock St., n s, 470′ e Bedford Ave., 3 three-st'y stone dwells.; cost, each, $7,000; owner, architect and builder, S. E. C. Russell, 58 Hancock St.

North Eighth St., n w cor. Second St., four-st'y brick tenement; cost, $10,000; owner, John Brady; architect, T. F. Houghton.

Adams St., *No.* 91, n s, 133′ 10″ w Evergreen Ave., two-st'y frame dwell.; cost, $2,500; owner and builder, Fr. Herr, Broadway; architect, Th. Engelhardt.

Union Ave., *No.* 58, being 125′ n Powers St., three-st'y frame tenement; cost, $3,500; owner, Chas. Ferguson; architect, E. F. Gaylor; builders, Marinus & Gill.

Degraw St., s s, 37′ 6″ e Nevins St., one-st'y brick station meter house; cost, $3,500; owner, the Fulton Municipal Gas Co., 342 Fulton St.; architect, J. F. Harrison; builder, R. Deeves.

Kent Ave., s e cor. Rodney St., two-st'y brick factory; cost, $3,000; owners, G. F. & J. A. Simpson, on premises; architect, E. F. Gaylor; builder, Thos. Gibbons.

India St., *Nos.* 83 *and* 85, n s, 195′ e Franklin St., 3 three-st'y frame dwells.; cost, $4,000 each; owner, Henry Stiles, 115½ India St.; architect, F. Weber; builders, Henry Stiles and Thomas Davies.

Willoughby Ave., s s, 125′ w Tompkins Ave., 5 two-st'y stone dwells.; cost, $3,500 each; owner, Richard C. Addy, 594 Willoughby Ave.; builders, John Softy and Richard C. Addy.

Chicago.

STORE AND OFFICE-BUILDING. — The contracts for a building on the cor. of Wabash Ave. and Jackson St., for A. J. Averill, have been let by F. L. Charnley, architect; it will be six stories and basement, and will cost $60,000.

STORE. — C. O. Hausen has in hand plans for three-st'y and attic store and dwell., for P. Lagone, to cost $10,000.

BUILDING PERMITS. — A. P. Upham, two-st'y brick dwell., 21′ x 57′, 18 Evergreen Pl.; cost, $4,500.

John Arnold, two-st'y brick store and dwell., 24′ x 45′, 299 Mohawk St.; cost, $4,000.

L. L. Barbour, two-st'y brick store and dwell., 50′ x 80′, West Van Buren St., near Leavitt St.; cost, $10,000.

C. Marlow, two-st'y and basement brick dwell., 20′ x 46′, No. 12 Keith St.; cost, $3,000.

James Maher, 2 three-st'y and basement brick stores and dwells., 54′ x 75′, 3042 and 3044 Archer Ave.; cost, $10,000.

W. M. Baker, one-st'y and basement brick store, 30′ x 80′, Emerald Ave. and Thirty-first St.; cost, $4,000.

H. Staderman, three-st'y and basement brick store and dwell., 220 State St.; cost, $3,600.

W. F. Rems, two-st'y and basement brick dwell., 25′ x 60′, 666 La Salle St.; cost, $8,000.

Samuel Shackford, three-st'y and basement brick dwell., 21′ x 44′, 342 North La Salle St.; cost, $6,000.

Wm. Jackson, 2 two-st'y dwells., 34′ x 40′, 1409 and 1411 Jackson St.; cost, $3,500.

Fred. Greely, three-st'y and basement brick dwell., 26′ x 39′, 354 Huron St.; cost, $6,000.

J. C. Bauer, two-st'y brick store and dwell., 22′ x 40′, 1203 Fulton St.; cost, $4,000.

John De Vos, two-st'y brick dwell., 25′ x 48′, Racine St., near Belden Ave.; cost, $4,000.

Wm. Ward, one-st'y brick cottage, 20′ x 48′, Arthington St., near Centre Ave.; cost, $3,000.

C. Johnson, two-st'y brick dwell., 36′ x 44′, 78 Ohio St.; cost, $7,500.

P. McAuliff, two-st'y brick dwell., 22′ x 48′, No. 624 Twentieth St.; cost, $3,700.

Hugh Copeland, 2 two-st'y brick dwells., 24′ x 40′ each, 707 Congress St.; cost, $5,000.

Robert Excell, 4 three-st'y brick stores and dwells., 53′ x 80′, Nos. 68 to 74 Thirty-fifth St.; cost, $20,000.

J. C. Black, two-st'y and basement brick dwell., 30′ x 60′, No. 9 Walton Pl.; cost, $20,000.

Lawndale Congregational Church, 40′ x 40′, 1076 Central Park St.; cost, $5,000.; C. P. Randall, architect.

F. C. Heath, three-st'y brick dwell., 27′ x 60′, 2810 South Park Ave.; cost, $6,500.

Rev. P. W. Reardon, two-st'y brick sodality-house, 31′ x 71′, 2922 Wabash Ave.; cost, $9,000.

J. L. Campbell, two-st'y and basement brick dwell., 34′ x 62′, 373 to 377 South Hoyne Ave.; cost, $8,000.

W. Roemer, two-st'y brick dwell. and store, 22′ x 60′, 699 North Paulina St.; cost, $4,000.

August Meyer, two-st'y and basement brick dwell., 22′ x 52′, n w cor. Wood and Superior Sts.; cost, $4,000.

J. L. Waller, 6 two-st'y and basement brick dwells., 57′ x 119′, 190 to 200 Ashland Ave.; cost, $15,000; E. Bauman, architect.

Nic Holzer, two-st'y brick dwell., 21′ x 40′, 358 Thirteenth St.; cost, $3,000.

M. Meyer, three-st'y brick dwell., 31′ x 35′, 253 Rush St.; cost, $3,000.

Mrs. M. Neuberger, three-st'y and cellar brick dwell., 24′ x 39′, 292 North State St.; cost, $6,000.

D. H. Small, 2 one-and-a-half-st'y brick cottages, 22′ x 36′, Genesee Ave.; cost, $3,000.

J. P. Green, three-st'y and cellar brick dwell., 22′ 6″ x 93′, 3629 Ellis Park; cost, $11,000.

Wm. Thompson, two-st'y brick dwell., 25′ x 31′, 1713 Indiana Ave.; cost, $3,500.

Eich Bros., 6 two-st'y brick dwells., 50′ x 120′, 1074 to 1082 West Monroe St.; cost, $18,000.

J. Mosel, three-st'y and attic brick dwell., 24′ x 60′, 36 Crosby St.; cost, $5,500.

H. Smyth, two-st'y brick dwell., 22′ x 58′, 118 Hoyne Ave.; cost, $4,500.

Jacobson & Tolman, 20 one-st'y brick cottages, 20′ x 36′ each, Dania Ave.; cost, $20,000.

P. Malamy, two-st'y brick dwell., 22′ x 48′, 3141 Wentworth Ave.; cost, $3,000.

Geo. Misch, three-st'y and basement brick shop, 20′ x 80′, Washington St., near Franklin St.; cost, $3,500.

A. Kulp, one-st'y and basement brick dwell., 24′ x 54′, 577 Superior St.; cost, $3,500.

W. J. Breckbill, two-st'y and basement brick dwell., 24′ x 40′, 281 Webster Ave.; cost, $3,300.

Wm. Ryan, three-st'y and basement brick flats, 23′ x 60′, 140 Thirteenth St.; cost, $8,500.

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Wm. Hoeppke, two-st'y brick dwell., 24' x 60', 455 Lincoln St ; cost, $3,100.

G. Lempke, two-st'y brick dwell., 24' x 60', 1079 Leavitt St.; cost, $3,200.

E. & L. H. Harland, 6 two-st'y and basement brick dwells., 37' x 96', Webster Ave., e of Clark St.; cost, $20,000.

George Watson, five-st'y and basement brick warehouse, 106' x 175', La Salle & Kinzie Sts.; cost, $70,000.

Real Estate Managers of Chicago Board of Trade, stone building, 173' x 225', on the block bounded by Jackson, Van Buren, Sherman Sts. and Pacific Ave.; to cost $1,000,000; W. W. Boyington, architect.

L. S. Dieler, two-st'y brick dwell., 32' x 95', 23 to 29 Diller St.; cost, $8,000.

St. Malachi Church, 60' x 110', Western Ave. and Walnut Sts.; cost, $25,000; James R. Willett, architect.

D. Hanrahan, two-st'y brick flats, 21' x 64', 964 North Clark St.; cost, $6,000.

C. Sheehy, 2 one-st'y brick cottages, 20' x 50' each; Thirty-first St., near Broad St.; cost, $3,000.

J. Hickson, two-st'y brick dwell., 24' x 50', Hurlbut St., near Belden Ave.; cost, $5,000.

F. Slivik, three-st'y and basement brick flats, 25' x 60', 94 Johnson St.; cost, $6,500.

Sister Vincent, two-st'y brick addition to school, 30' x 65', 190 North Paulina St.; cost, $7,000.

A. Kreuger, two-st'y brick dwell., 21' x 50', 393 Maxwell St.; cost, $4,000.

F. Kreikenbaum, two-st'y brick store and dwell., 22' x 38', 1072 Milwaukee Ave.; cost, $3,500.

Cincinnati.

Depot. — The work has been let for the foundations for the new union depot to be erected corner of Pearl St. and Central Ave.; W. W. Boyington, of Chicago, architect; W. P. Thorp, local superintendent. The following are the contracts as awarded: Limestone work, H. Meiners & Son, $4,300; freestone, John Boyle, $8,900; carpenter-work, W. H. Stewart Sons, $1,300; M. Clements received the contract for the iron sheds, which will be glazed by the Rendle skylight.

Building Permits. — Since the last report the following building permits have been issued: —

Pat. Mahenny, three-st'y frame dwell., State St., near Liberty St.; cost, $2,000.

F. B. Kearney, two-st'y frame dwell., Elm St., between Vine and Chapel Sts.; cost, $4,000.

F. Dorman, two-st'y frame dwell., Dorman St., near Spring Grove Ave.; cost, $3,000.

J. G. Murdock, five-st'y brick factory, Home St., near Fourth St.; Henry Bevis, architect; cost, $4,500.

Andrew Burkhardt, three-st'y frame dwell., Charlton St., between Gest and Clark Sts.; cost, $5,000.

Nine permits for repairs; cost, $5,200.

Denver, Col.

Stores. — John Baker, two-st'y brick business house, 39' x 106', Twelfth St.; cost, $10,000.

Moritz Barth, four-st'y stone business block, 25' x 62' 6", Lawrence St.; cost, $21,000; R. S. Roeschlaub, architect.

Churches. — Central Christian Church, 60' x 84', Broadway; cost, $26,000.

First Baptist Church, Stout St., 75' x 120', brick, with stone trimmings; F. E. Edbrooke, architect.

Warehouse. — E. F. Hallack, brick warehouse, 42' x 200', Nineteenth St.; cost, $15,000.

Houses. — Wm. J. Barker, two st'y brick residence, East Eighteenth St.; cost, $20,000.

J. W. Timmerman, block of 3 dwells., Twenty-second St.; cost, $8,000; F. E. Edbrooke, architect.

T. Drummond, double two-st'y brick dwell., South Fifteenth St.; cost, $7,000.

J. W. Shoekelton, block of dwells., 53' x 56'; cost, $9,000; J. H. Littlefield, architect.

J. W. Shoekelton, double two-st'y brick dwell., 41' x 52'; cost, $8,000; J. H. Littlefield, architect.

J. W. Shoekelton, 5 two-st'y brick dwells., Glenarm St.; cost, $17,000; J. H. Littlefield, architect.

J. M. Carico, block of two-st'y brick dwells., 33' x 100', Glenarm St.; cost, $9,000.

New York.

There has been little new work projected lately, we hear, however, of preliminary estimates being requested for some large buildings.

Bachelors' Apartment-House. — For Mr. Taylor of Jersey City, and others, a bachelors' apartment house, 23' x 96', is to be built at No. 501 Fifth Ave., at a cost of about $50,000, from designs of Messrs. McKim, Mead & White. The materials will be stone, brick and terra-cotta.

Church. — New plans have been drawn by Messrs. D. & J. Jardine for the Cornell Memorial Church, which is to be built of Ohio stone and brownstone, 77' x 98', and will cost about $40,000.

Building Permits. — *Fourth Ave.*, n e cor. One Hundred and Sixth St., 9 four-st'y stone tenements; cost, each, $14,000; owner and architect, Alfred Kehoe, 259 West One Hundred and Twenty-third St.; builder, John Askey.

One Hundred and Forty-first St., n s, 29' 8" w Morris Ave., 2 three-st'y frame tenements; cost, each, $3,000; owner, Elizabeth Dunn, 347 College Ave.; architect, E. F. Dunn; builder, not selected.

Madison Ave., n e cor. One Hundred and Twenty-fourth St., seven-st'y brick, stone and terra-cotta apartment-house; cost, $104,500; owner, Harvey Murdock, 83 Woodhull St., Brooklyn; architect, H. J. Dudley.

Thirty-third St., s s, 150' e First Ave., six-st'y brick warehouse; owners, Frederick C. Linde, et al., 164 Ross St., Brooklyn; architect, H. J. Schwarzman; builders, Robinson & Wallace.

Seventy-sixth St., n s, 153' w Second Ave., one and two st'y stone church; cost, $40,000; owner, Cornell Memorial Methodist Episcopal Church, 805 Broadway; architects, D. & J. Jardine; builder, E. Kilpatrick.

Fifth Ave., No. 501, seven-st'y stone, brick and terra-cotta apartment-house; cost, $50,000; owner, John D. Taylor, Jersey City; architects, McKim, Mead & White.

One Hundred and Thirty-second St., n e cor. Seventh Ave., one-st'y restaurant; cost, $5,000; owner, John B. Haskin, Fordham, N. Y.; architect, W. W. Gardner.

One Hundred and Thirty-fifth St., s s, 110' w Fifth Ave., 3 four-st'y brick tenements; cost, each, $13,000; owner, Patrick Whelan, One Hundred and Thirty-eighth St., e of Southern Boulevard; architect, J. F. Burrows.

East One Hundred and Sixteenth St., No. 176, one-st'y brick shed; cost, $2,500; owner, R. Huson, 218 East Fifteenth St.; architect, Chas. Baxter.

Jackson Ave., w s, 225' n One Hundred and Fifty-sixth St., two-st'y frame dwell.; cost, $3,000; owner, Clara Decker, 841 Forrest Ave.; architect, W. W. Gardiner; builder, P. P. Decker.

Alterations. — *East Seventy-first St., No.* 101, three-st'y brick extension; owner, Everett P. Wheeler, on premises; architects, Geo. F. Babb and Walter Cook; builders, D. Campbell and Hamilton & Henry.

East Sixty-fifth St., Nos. 41 *and* 43, three-st'y brick extension; cost, $3,000; owner, C. H. Raymond. Grand Hotel, Broadway and Thirtieth St.; architect, F. T. Camp.

East Ninth St., No. 16, general alteration; cost, $4,500; owner, Peter B. Olney, 140 West Forty-seventh St.; architect, C. C. Haight; builders, Robinson & Wallace and C. E. Hadden.

Philadelphia.

Club-House. — The Bachelor Barge Club are having a club-house, 47' x 58' 6", on the banks of Schuylkill River; Hazelhurst & Huckel, architects.

Building Permits. — *Huntingdon St.*, n s, w of Howard St., 7 three-st'y dwells., 13' x 28'; P. Thompson, contractor.

Chancellor Pl., n s, e of Thirty-third St., 11 three-st'y dwells.; 16' x 42'; A. Demmell, owner.

Thirty-second St., cor. Thompson St., elevator, 54' x 72'; Jas. B. Doyle, contractor.

Thirty-second St., e s, between Thompson & Master Sts., two-st'y wash-house, 42' x 74'; J. B. Doyle, contractor.

Filbert St., No. 910, four-st'y store, 17' x 80'; J. B. Doyle, contractor.

Thirty-first St., cor. Master St., three-st'y brewery, 40' x 60'; J. B. Doyle, contractor.

Fifth St., w s, s of Huntingdon St., 11 three-st'y dwells. and stores, three, 16' x 50', eight, 14' x 48'; H. M. Housekeeper.

Fourth St., e s, n of Walnut St., rebuilding building, 50' x 175'; A. A. Campbell, contractor.

Eleventh St., w s, n of Somerville St., two-st'y dwell., 18' x 90'; C. H. W. Keyser, contractor.

Mervine St., e s, n of Somerville St., two-st'y dwell. and two-st'y stable, 18' x 18' and 18' x 30'; C. W. Keyser, contractor.

Esther St., e s, n of Thompson St., two-st'y stable, 16' x 40'; Lewis Wolter, owner.

North Twenty-third St., Nos. 1900 *to* 1950, 26 three-st'y dwells., 16' x 56', on w s; 26 dwells. on e s, 26' x 56'; E. H. Flood, contractor.

Judson St , Nos. 1900 *to* 1950, 26 three-st'y dwells., 16' x 56', w s; 26 three-st'y dwells., e s, 16' x 56'; E. H. Flood, contractor.

Venango St., s s, e of R St., two-st'y dwell., 16' x 40'; D. C. Schuler, contractor.

Corinthian Ave., w s, between Brown and Parrish Sts., 20 three-st'y dwells., 17' x 55'; Jno. McGill, owner.

Fifteenth St., e s, n of Cumberland St., 4 three-st'y dwells., 18' x 60'; Benj. Ketcham, contractor.

West College Ave., w s, s of Thompson St., 2 two-st'y dwells., 16' x 45'; Wm. Peoples, owner.

Fifth St, e s, n of Butler St., 3 two st'y dwells., 16' x 44'; Jacob Simons, owner.

American St, n e cor. Diamond St., two-st'y storehouse and two-st'y stable, 50' x 119' and 29' x 50'; Eldridge & Stewart, owners.

Third St., s e cor. Willow St., fourth-st'y addition to factory and gable wall, 40' x 70'; Thomas McCarty, contractor.

North Second St., No. 1425, fourth-st'y addition to dwell., 36' x 5 ; Thos. McCarty, contractor.

Eleventh St., s e cor. Market St., four-st'y addition to the Bingham house, 44' x 103'; Benj. Ketcham & Son, contractors.

Johnson St., s s, between Germantown Road and Jefferson St., 3 three-st'y dwells , 15' x 34'; Wm. Kohl, contractor.

Terrace St., s e of Cedar St., 2 two-st'y dwells., 14' x 32'; Jno. & David Harper.

Race St., No. 1124, second-st'y addition to stable, 20' x 70'; Geo. K. Halloway, contractor.

Fifth St., s e cor. Eustis St., three-st'y dwell., 16' x 54'; A. M. Greene, contractor.

Palmer St., n s, between Thompson and Belgrade Sts., 5 two-st'y dwells., 13' x 40'; W. H. Rookstool, owner.

Twenty-eighth St., e s, s of Brown St., second and third st'y addition to building, 19' x 50'; Wm. Glass.

Wood St., s e cor. Grape St., three-st'y dwell. and store, 22' x 38'; S. S. Keely, contractor.

Ripka Ave., s e s, between Washington and Hamilton Sts., 2 three-st'y dwells., 18' x 32'; S. S. Keely, contractor.

North Fifth St., No. 2714, three-st'y dwell., 20' x 70'; Frank Gilbert, contractor.

Sixty-third St., w s, n of Vine St., three-st'y dwell., 18' x 48'; Lewis J. Leger, owner.

Pear St., w of Fifty-second St., 3 two-st'y dwells., 16' x 41'; Chas. Christine, contractor.

Paschall St., s s, w of Fifty-first St., two-st'y dwell., 16' x 44'; Chas. Christine, contractor.

Wissaaoming St., n w s, between Friendship and St. Vincent Sts., two-st'y dwell., 18' x 40'; Crosta & Ploucher, contractors.

Rochester.

Contracts have been let for the following work: — Improvements to the "Church of the Epiphany;" Pike & Gould, contractors; cost, $4,000.

Improvements to residence of Edward Harris, Esq., East Ave.; Pike & Van Dorn, contractors; cost, $6,000.

Improvements to residence of Alfred Wright, Esq., West Ave.; Kooman & Kusse, contractors; cost, $6,000.

St. Louis.

Building Permits. — Forty-eight permits have been issued since our last report, seventeen of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Henry Stiften, 3 three-st'y dwells.; cost, $10,000; H. Heitmann, contractor.

George Becker, two-st'y store and dwell.; cost, $7,000; H. R. Becker, contractor.

Harrison Wire Co., one-st'y works; cost, $4,000.

Mrs. Wm. McKee, 4 two-st'y dwells.; cost, $20,000; Chas. E. Illsley, architect; Kerr & Allan, contractors.

Louisa Sievers, 4 two-st'y dwells.; cost, $2,500; J. H. Frye, contractor.

Wm. H. Niedringhaus, 4 two-st'y dwells.; cost, $3,400; Aug. Beinke, architect; J. Wharton, contractor.

C. C. Cowers, two-st'y dwell.; cost, $2,700; P. Child, contractor.

James Cummisky, 2 two-st'y dwells.; cost, $5,000; S. C. McCormack, contractor.

Mrs. E. A. Jennings, 2 two-st'y dwells.; cost, $10,000; Geo. Pipe, architect; L. H. Schaffner, contractor.

N. F. Hickmann & Son, three-st'y dwell.; cost, $6,500.

Mrs. M. Mohr, two-st'y dwell ; cost, $3,000; W. Klattus, architect; P. Sauerwein, contractor.

PROPOSALS.

IRON FOOT-BRIDGE.

[At Boston, Mass.]

Office of City Engineer,
City Hall, Boston.

Sealed proposals for building an iron foot-bridge over the Boston & Providence Railroad at West Rutland Square and Durham Street, indorsed "Proposal for building an Iron Foot-Bridge," will be received at the office of the Superintendent of Streets, City Hall, Boston, **until 12 o'clock, M., of Thursday, August 31, 1882.**

Specifications may be obtained at the office of the City Engineer, City Hall, Boston, and the plans may be seen there on and after August 24, 1882.

The committee on paving reserves the right to reject any or all bids should it deem it to be for the interest of the City of Boston to do so.

LUCIUS SLADE,
348 Chairman Committee on Paving.

ARTIFICIAL PAVEMENT, ETC.

[At Washington, D. C.]

Office of the Engineer Commissioner,
Washington, D. C., August 21, 1882.

By direction of the Board of Commissioners sealed proposals will be received at this office **until 12 o'clock, M., Wednesday, August 30, 1882,** for the improvement of various streets in the city of Washington

The principal items and approximate quantities of work contemplated under this advertisement are as follows: —

Laying granite block pavement, 10,000 square yards.

Grading, 3,600 cubic yards.

Laying sidewalk of artificial stone or asphalt, 10,000 square yards.

Blank forms of proposals and specifications can be obtained at this office upon application therefor, together with all necessary information, and bids upon these forms will alone be considered.

The right is reserved to reject any and all bids or parts of bids.

G. J. LYDECKER,
Major of Engineers, U. S. A.,
348 Engineer Commissioner, D. C.

SANATORIUM.

[At Dansville, N. Y.]

Sealed proposals will be received by the undersigned **until Tuesday, the 5th of September, at noon,** for the erection and completion of a five-st'y fire-proof brick building, 272' in length and about 50' in width, for a sanatorium, on the site of the one recently destroyed by fire in Dansville, N. Y. Drawings and specifications can be seen and information had on application to the architects, Warner & Brockett, 62 Powers Block, Rochester, N. Y.

The right to reject any and all bids is reserved.

Acceptable bonds for the faithful performance of the contract will be required.

PROPRIETORS DANSVILLE SANATORIUM.

LIMESTONE.

[At Cincinnati, O.]

The Cincinnati Gas-Light and Coke Company will receive tenders **up to noon, Saturday, September 16, 1882,** for

Eight thousand perches of Blue Hill limestone, to be delivered at "East End Garden," First Ward, running from Front St. to Ohio River, between Main and Spencer Sts.

Five hundred perches of paving-stone, to be delivered between first of October and first of November.

Two thousand five hundred perches of building stone, to be delivered between first of November, 1882, and first of January, 1883.

Two thousand perches of building-stone, to be delivered between first of January and first of March, 1883.

Three thousand perches of building-stone, to be delivered between first of March and first of May, 1883.

Plans and specifications on file at the Gas Office. Company reserves privilege of rejecting any or all bids. 350

PILES.

[At Cincinnati, O.]

The Cincinnati Gas-Light and Coke Company will receive tenders **up to noon, Wednesday, August 30,** for furnishing and placing in position on river front of East End Garden, First Ward, in accordance with plans and specifications on file at the gas office:

Three hundred and sixty piles, from thirty to forty-five feet in length.

Piles to be on the ground ready for use previous to October 1.

Company reserves privilege of rejecting any or all bids. 348

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & CO. No. 349.

SEPTEMBER 2, 1882.

Entered at the Post Office at Boston as second-class matter.

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THE result of the official investigation into the sanitary condition of the hotel at Seabright, N. J., whose proprietor had to be paid five thousand dollars to prevent him from turning two typhoid-fever patients summarily into the street, is given in the *Sanitary Engineer*. It seems that the hotel is situated on a ridge between the ocean and a salt-water creek, into which the overflow from two cesspools, which receive all the house-wastes, is allowed to run. One of the overflow pipes had been broken by ice, and the discharge escaped into the ground around the cesspool, which was very offensive. The other opened under a wharf, near one end of the hotel, depositing a slimy mud which at low tide gave out a sickening stench. At high tide the end of this pipe was covered, and the air from the cesspool returned into the building by way of the soil-pipe, which was not trapped. It was also found that a part of the waste from the kitchen sink, as well as from the barber's basins, emptied directly into the cellar. In view of these facts, the Board of Health notified the proprietor of the hotel that its condition was dangerously unsanitary, and if he escapes the troubles which his indignant guests have prepared for him, he will probably have to make some radical change, or else go without boarders next summer. Although so much has been said about this particular case, we do not imagine that, aside from the extortion practised upon the friends of the two fever patients, the circumstances were any worse than those which prevail about most summer resorts. Our own experience certainly is that a country hotel or boarding-house which is not, after the middle of the season, pervaded by the acrid flavor of decomposing filth, so familiar to those accustomed to sanitary investigation, is exceptional. The worst are generally those which pretend to a certain fashion, and profess to be supplied with "modern conveniences," but many of a more primitive style are nearly or quite as bad.

THE Water Commissioners of Newark and Jersey City have been examining the tributaries of the Passaic River, from which the two towns obtain their supply of water, to see whether their condition is such as to indicate the probability of contamination of the stream. An analysis of water from two of these feeders, the Springdale Lake and the Second River, has been made, with rather discouraging results. The liquid from the former source was found to be "milky;" the "taste unpleasant;" and it was filled with a greenish-white vegetable growth. The Second River water was "bluish," the "taste bad," "smell bad." Both the samples contained ammonia, nitrates, and chlorine in a proportion many times greater than that which is usually regarded as permissible. Whether the quality of the water was restored farther down the river by the flow of carbolic acid from the paper-mill waste, which the proprietor of the mill supposed to be so salubrious in its effect, we do not know, but the investigation seems to show that the purification of the Passaic will not be an easy matter.

MR. KEELY, the proprietor of the mysterious motor which bears his name, has given unmistakable proof of an ingenuity, not to say an astuteness, in his dealings with the stockholders of his company, which quite prepares us for further revelations of his inventive genius. Our readers will remember that in response to the application of the stockholders Mr. William Boekel was appointed by the Court of Common Pleas as an expert, to learn from Mr. Keely the secret of the construction and operation of the motor, and report to the stockholders according to his discretion. The report has now been made, and it seems that Mr. Keely, by "elaborate written communications," "diagrams," and so on, has imparted to Mr. Boekel various facts which convince him "that a new force or motive power has been discovered." This motive power, which is called "etheric force," "vaporic force," and other appropriate names, "possesses properties wholly phenomenal in character," and "involves the study of vibratory forces," so that the expert, although he is "of opinion that Mr. Keely has so far perfected his invention as to be entitled to letters patent," does not "possess that intimate degree of knowledge of the entire subject," which would enable him to put together the motor and reproduce Mr. Keely's results. In fact it turns out that Mr. Boekel has not seen the motor in operation at all, but seems to have taken the inventor's word for everything. Even his amiable mind appears, however, to have comprehended the unsatisfactory character of such a report, and he appends to it a copy of a letter written by him to Mr. Keely, requesting that the motor, which is now "partially dismantled," should be put in order and operated for his instruction. To this the great inventor replies, saying that the motor is not only dismantled but "oxidized," and that "as soon as the Company shall have furnished him with the means to prosecute his work" he will have it cleaned and put together, and will then further aid the expert in his investigations "to the utmost of his ability."

A REMARKABLE example of the way in which the infection of typhoid fever may be communicated is to be found in a report made to an English official board by one of its local inspectors. In a certain town, situated in a district naturally healthy, a severe outbreak of fever attracted the notice of the inspector, and an investigation of the circumstances was made. It appeared that a patient suffering with the disease had been brought to one of the houses in the village, which was furnished with the ordinary sink and pump, placed directly over the well. The sink was probably leaky, like hundreds of other sinks, and water from the washing of linen used by the patient being either thrown or allowed to fall into the sink, made its way through the seams back into the well, carrying with it the potent poison of the fever, which quickly spread through the household. In other cases the contagion seemed to have come from the public water-supply, and examination showed that the water-closets in many houses were flushed by a valve directly from the mains, without the intervention of a cistern, so that by some interruption of the flow foul matter had probably been sucked back into the service-pipes, to circulate through the whole water-system. So many outbreaks of fever have been traced to infection disseminated in this latter way that there is something wonderful in the assurance with which persons who ought to know better maintain that the old-fashioned valve closets are practically unobjectionable. It is true that the system of constant water-supply universal with us diminishes the danger of the entrance of foreign substances into the service-pipes, but it does not wholly remove it. In few of our large cities is the pressure of the water sufficient to carry it at all times above the highest story of every house, and thousands of fixtures are in daily use which are liable to have their supply fail altogether on certain days and hours, or to have it withdrawn temporarily by the opening of a faucet below. All such fixtures are exposed to the worst consequences of intermittent supply. If any person having access to fixtures so placed will try the experiment of opening a faucet at the time of low water, the rush of the air sucked back into the pipe will be plainly heard; or by placing the finger over the mouth of the faucet the inward pressure can be felt. Even where the head is considerable, an artificial lowering may be, and often is, caused by the opening of faucets in the lower stories, which will leave a vacuum in the pipes supplying the upper fixtures; and in such cases substances near the mouth of the upper faucets are liable to be sucked through them into the supply-pipes. We have known the opening of a pantry-cock in a lower story to siphon out in this way and discharge into the pantry sink the entire contents of a bath in a room above, much to the amazement of its occupant. The bath happened to be fitted with a bottom

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supply, or air instead of water would have been drawn into the pipes, but with water-closets the supply is always dangerously near the contaminating matter in case of back flow.

Captain Cowdon's modest scheme for digging a ditch from the Mississippi below New Orleans to Lake Borgne, at a cost of about a hundred thousand dollars, has grown in his estimation to an enterprise which, among other things, will "continue to enrich the East, and will stretch the sinews of commerce across the continent from north to south, laying the foundation for a Government based on good will that will be more lasting than one of bayonets and bonds of triple steel." It is not very evident how the substitution of a twenty-eight-foot ditch at the mouth of the Mississippi for one of twenty-four feet is to accomplish such desirable results; but Captain Cowdon explains further that by this means vessels of from five to seven thousand tons capacity will be able to reach New Orleans, in place of those of twenty-five hundred tons, which is now the limit; and as cotton is now carried from New York to Liverpool in ships of the larger size for eighty-five cents per bale, while the charge from New Orleans to Liverpool in the smaller ones is three dollars per bale, he infers that when his canal is made, and the seven-thousand-ton steamers come to the wharves of New Orleans, the cost of transporting cotton from that port will be reduced to the same, or nearly the same amount as from New York. In consequence of this improvement "a direct trade with South and Central America" is to be "opened up;" seventy millions of acres of land in the Mississippi valley are to be reclaimed, which "will make their annual agricultural production fully one thousand million dollars more than at present;" and Chicago, by deepening the Illinois and Michigan Canal and the Illinois River, is to "become, as it were, a city of the seaboard as well as the leading manufacturing mart of the West," while in general an "empire is to be developed of fertility, wealth, power, and splendor such as will have no parallel in history." It seems a pity to insinuate a doubt concerning such a dazzling prospect, but Captain Cowdon's logic is rather more nimble than that to which we are accustomed, and some of the steps in his reasoning are difficult to follow. The assumption, for instance, that as soon as ships of twenty-eight feet draught can come up to New Orleans the price of cotton freights to Liverpool will be reduced to a third of the former rates, is quite gratuitous. The cost of freights across the Atlantic depends quite as much on the facilities for disposing of one cargo as for securing another in return, and cotton will probably always be carried at low rates from New York, and at high rates from New Orleans, for the reason that taking the outward with the homeward voyage this is the most profitable arrangement; and the empire of unparalleled wealth, power and splendor which is to depend upon the reduction of cotton freights between New Orleans and Liverpool to eighty-five cents per bale will be long in coming.

Le Génie Civil mentions the fact that several manufactories of cement tiles have been recently established in France, and that their product is coming into extensive use. Such cement tiles have long been made in Holland, and furnish a pavement of agreeable texture and appearance at a very low price. The tiles are made in a great variety of forms, and of several colors. For black the material is mixed with powdered pyrolusite, or black oxide of manganese; blue is made by admixture of French ultramarine, and yellow by means of ochre, while green is given by combining the last two. Brown is also obtained with ochre. Some of the tiles have patterns stamped on them, and filled in with a different color, and the range of tints might be greatly extended without difficulty. For hastening the hardening of the tiles, which are composed of Portland cement and sand, a stream of carbonic-acid gas is allowed to play upon them. A much better method, we should think, would be to dip them after setting in a solution of silicate of soda. There are many uses to which such tiles could be put in this country, and we should be glad to see their manufacture attempted here.

A very destructive explosion of gas took place in Paris last month, causing the death of ten persons and wounding many more. It is supposed that a water-main first gave way underground, washing out the earth about it so as to take away the support of a neighboring gas-main, which settled, opening the joints and allowing the gas to escape. The street being paved with asphalt over a bed of concrete, was impervious to the gas, so that no odor was perceived near the break, and the concrete was thick enough to form a strong arch, over which all the traffic of the thoroughfare passed while the subsoil beneath was disappearing under the action of the water. The first place where the escape of gas was noticed was in the cellar of a house near by, and the officials of the gas-company were immediately informed. This was at twenty minutes before eight in the morning. At eight o'clock workmen came to repair the leak, but just before their arrival the gas had found an issue into another cellar, where it caught fire from a candle. At twenty-five minutes past eight an explosion took place in the basement of a barber's shop on another street, and ten minutes afterward came a second, and far more violent one, on the opposite corner of the same street, which completely destroyed two buildings, killing and wounding many of their occupants, as well as some of the people who had gathered at the scene of the explosion on the opposite side. At half-past twelve a third explosion took place, but without doing much damage. The successive detonations in so many places are explained by the supposition that fissures in the ground were made by the settlement due to undermining by the water, which were filled by the escaping gas, to which fire was led from the original explosion.

A Philadelphia gentleman has recently had a sad experience with his telephone. According to the Boston *Journal*, in using the instrument he stood with his face quite close to "the hooks which hold the transmitter," and perhaps unconsciously touched them. "Suddenly he seemed to see a bright blue and white fire shoot out of the very body of the instrument, and at the same moment he experienced a sensation like having a claw seize and drag up the skin of his forehead, and holding him by it shake him to and fro with great violence." He was partially stunned, and on recovering himself, after the lapse of half an hour, found his watch hopelessly disordered. There was no storm at the time, or the transmission of lightning over the wire would seem to be the most probable explanation of the phenomenon, but in default of that, the crossing of the line with an electric-light wire might easily account for it. However that may be, it seems quite time that lightning-arresters should be applied to all telephones. As usually introduced in the country, with several subscribers on each circuit, the crackling of the instrument during a thunder-shower, unless the wire is disconnected, is quite sufficient to alarm a nervous person, and the possibility of an unexpected shock at any time certainly does little to encourage the spread of the system.

The final competition for the Prize of Rome in the architectural section of the Ecole des Beaux-Arts resulted in the choice of M. Esquié, pupil of M. Daumet, the two Second Grand Prizes having been awarded to M. Tournaire, pupil of M. André, and M. Courtois-Suffit, pupil of MM. Suffit and Pascal. Next year is to be held in Paris a grand triennial exhibition of fine art, including works of painting, sculpture, and architecture, and open to foreign as well as native artists. The number of works to be exhibited is restricted to one thousand in painting and monochrome, three hundred in sculpture, fifty in architecture, and one hundred and fifty in engraving, and entrance for examination by the jury must be made within the month of January, 1883.

The city of Boston is rapidly becoming enriched with works of art worthy of the name. Already a portrait bas-relief of Colonel Robert G. Shaw, one of the heroes of the war, is in process of execution by the skilful hands of Mr. St. Gaudens, and a statue of Theodore Parker is to be immediately commenced, while a third, and still more important memorial is in contemplation, in the shape of an equestrian statue of Paul Revere, the patriotic silversmith who gave the alarm through the neighboring country on the night before the battle of Lexington. We hope that the sculptor for this statue will be chosen with care. While nothing could be more characteristic and interesting than a first-rate figure of the young artisan on horseback, oblivious of costume, equilibrium, or anything else but the quickest method of arousing the sleepy villagers, an equestrian statue of the conventional sort, clothed in a toga and stretching out its beneficent hand over the world in general, would be worse than ridiculous. Few people would understand the difference more quickly than the inhabitants of Boston, and the committee which undertakes to make selection of the artist will probably feel sooner or later the difference between popular appreciation and its opposite.

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BUILDING SUPERINTENDENCE. — XXI.

PLUMBER.

[*If this is made a separate contract, as it usually should be, the full title and the General Conditions must precede the Specification.*]

Fixtures. There will be

In Basement: Set of four white earthenware Wash-Trays.
Cold Supply to Wash-Boiler.
One [*Hellyer's short Artisan Hopper*], with seat attachment and preliminary flush.
Sill-Cock.
Furnace Supply.

In First Story: One Soapstone Kitchen Sink with draining shelves and wall-plates.
One 50-gallon Bath-Boiler.
One Pantry Sink.

In Second Story: One Bath.
Three Wash-Basins.
One [*H. C. Meyer & Co.'s*] Brighton Water-Closet.

In Third Story: Tank.

Iron Pipes. All iron pipes, including both waste and air pipes, to be of the best quality, [*Mott's*] or [*Brady's*] make, with all proper fittings; the horizontal portion of the main soil-pipe in basement to be double-thick; all other iron pipes to be single-thick; and all to be thoroughly coated inside and outside in the best manner with asphaltum before putting up, and the outside to have a second coat afterwards: all to be put up in the best and strongest manner with iron hooks and stays, and the joints caulked with oakum and melted lead.

Lead Pipes. All cold-water supply, air, and waste pipes under 2 inches are to be best drawn lead, and to weigh as follows: —

Rising Main: ⅝ inch to weigh 4 lbs. per foot.

Other Supply-Pipes:

1-inch to weigh 5 lbs per foot.
¾ " " " 4 " " "
½ " " " 3 " " "
⅜ " " " 2 " " "

Waste, Air and Overflow Pipes:

2-inch to weigh 5 lbs per foot.
1½ " " " 3 " " "

Brass Pipes. Hot-water pipes throughout to be of National Tube Works' best seamless drawn plumbers' brass tubing, with brass fittings, all put together with red lead in the best manner and made perfectly tight.

All lead and brass pipes are to be put up in the best manner on boards set in place by the carpenter. The lead pipes are to be secured with hard metal tacks or brass bands and screws, and brass pipes with brass bands. No hooks are to be used. The hot and cold water pipes are to be kept at least ½" apart everywhere. All joints in lead pipes throughout are to be wiped joints, no cup-joints to be permitted anywhere; and all brass pipes are to be put up with right-angled turns so arranged as to allow free expansion and contraction. All connections between lead and iron pipes and traps are to be made with cast-brass ferrules, of the same size as the lead pipes, soldered to the lead pipes with wiped joints, and caulked with oakum and melted lead into the iron pipes.

Waste-Pipes. The waste-pipes are to run as follows: —

The main 4-inch soil-pipe is to be extended through the north side of cellar-wall, and jointed air-tight with clear Portland cement into the drain-pipe outside. From this point it is to run with uniform pitch along the cellar-wall, and under floor of basement water-closet, to a point in Laundry under second-story water-closet, with 4-inch Y-branch to receive trap of basement water-closet, and 3-inch Y-branch for waste-pipe from Laundry wash-trays, then turning up on Laundry wall with 4-inch Y branch and 4-inch brass trap-screw caulked in at the turn for cleaning out the pipe, and running straight up on Laundry wall through the Kitchen floor and Bath-room with 2-inch Y-branch below Kitchen floor for waste-pipe from Kitchen sink, 4-inch Y-branch below Bath-room floor for pipe from trap of water-closet, and 2-inch T-branch above all other connections for air-pipe from traps; and thence straight up through and two feet above the roof; the top to be protected with brass wire netting, and a flange of 16-oz. copper, 18" square, to be soldered on to protect roof, shingled in and warranted tight.

Three-Inch Waste. Carry a 3-inch iron pipe from the connection provided for it in Laundry with uniform pitch on north wall of Laundry to the corner, there turning, with Y-branch and 3-inch brass trap-screw for cleaning out, accessible from the vegetable-cellar, and continuing with the same pitch on east wall of Laundry behind wash-trays, with Y-branch for pipe from trap of wash-trays, to a point nearly under pantry sink in first story, and there turning, with Y-branch and 3-inch brass trap-screw at the turn for cleaning out, and continuing up on Laundry wall to China-closet, with 1½-inch Y-branch under floor for waste from pantry sink, and up through China-closet and closets over it, with double 1½-inch Y-branch under second-story floor for wastes from wash basins, and 2-inch T-branch for air-pipe from trap above all other connections and thence straight up through the roof and 2 feet above, with brass wire netting on top, and 18" x 18" flange of 16-oz. copper soldered on and all warranted tight.

Iron Air-Pipes. Carry a 2-inch iron air-pipe, all caulked air-tight in the same way as other iron pipes, from trap of basement water-closet beside the main soil-pipe to the connection with soil-pipe provided for it in Bath-room, with 2-inch T-branch above Bath-room floor for connection with lead air-pipe from traps of sink in kitchen, and wash-basin, bath and water-closet in Bath-room. Carry a separate 2-inch iron air-pipe from trap of Laundry wash-trays beside the 3-inch waste-pipe to the connection provided for it in second story, with 1½-inch T-branches to receive air-pipes from trap of pantry sink and second-story wash-basins.

Supply-Pipes. The plumber is to apply for ⅝-inch service-pipe from street main to house, and pay all charges, if any, for it, and is, when called upon, to furnish and fit up temporary cock in cellar to supply water for building. As soon as the house is plastered he is to complete the permanent supply-pipes as follows:

Rising-Main. Carry ⅝-inch four-pound rising-main up on cellar-wall and walls of Laundry, Kitchen and Bath-room, to tank in attic, with stop-and-waste cock at cellar-wall, and branches as follows:

In Basement:—¾-inch branch to Sill-cock.
½-inch branch to Furnace Supply.
½ " " " Water-closet cistern.
⅜ " " " Laundry wash-trays.

In Kitchen:—⅝-inch branch to Kitchen sink.
⅝-inch branch to China-closet, running on Kitchen ceiling, and dividing in China-closet into three ½-inch branches, one of which is to supply the pantry sink, and the other two the wash-basins in second-story chambers.

In Bath-room:—⅝-inch branch to bath; the same to supply wash-bowl by a ½-inch branch.
½-inch branch to Water-closet cistern.

Stop-and-Waste Cocks. Every branch from the rising-main is to have separate stop-and-waste cock in a convenient place, and so arranged that the pipe can be completely drained of water; and each of the three branches in China-closet is also to have separate stop-and-waste cock, to shut off the pantry sinks or either basin and empty the pipes at pleasure. All stop-and-waste cocks to be finished brass ground cocks of the best quality.

Pipe Lining. Line under and behind all pipes and traps above the first floor with eleven-ounce zinc, the horizontal joints to be well soldered, and the upright joints to be lapped. This lining is to enclose completely all pipes, to protect ceilings and walls from any defect or leak, present or future. The lining to be graded to certain points, and to be connected with ¾-inch drip pipes to run to basement, and empty over cistern of basement water-closet; the end of the pipe to dip below the water-line of cistern.

Tank. Line with 16-oz. tinned copper in the best manner the tank in attic, 4′ x 2′ x 4′, to be furnished ready for lining by the carpenter. Supply from the rising-main, with ⅝-inch finished brass compression ball-cock and 6-inch copper float, and put in 1¼-inch boiler valve, with ¾-inch pipe to boiler, and 1½-inch lead overflow pipe, to be carried down beside rising-main and to empty over kitchen sink, with the end over the sink turned up to form a trap.

Hot Water. Hot water will be supplied to Laundry wash-trays, Kitchen sink, pantry sink, bath, and three wash-basins.

Boiler. Furnish and fit up in Kitchen, beside range, a 50-gallon [*S. D. Hicks & Son*] first-quality, warranted copper bath-boiler, on Lockwood pattern cast-iron stand, to be connected to water-back of range with 1" brass pipe and ground-plug sediment-cock union coupling, and to have waste-pipe carried to the waste-pipe from kitchen sink. The boiler is to have three brass pipe-couplings on top, one for the supply from tank, and the others for two separate ¾-inch hot-water supplies. One of these is to be carried on Kitchen ceiling, with ⅝-inch branch to Kitchen sink, thence to Bath-room, with ⅝-inch branch to bath and ½-inch branch to wash-basin, and to continue on Bath-room wall and ceiling to connect with the supply-pipe from tank to boiler for circulation, and a ½-inch expansion pipe to be carried from the highest point of the circulation pipe two feet above the tank, and turned down over the mouth of the overflow pipe. The other ¾-inch hot-water supply-pipe is to be carried on Kitchen ceiling to China-closet, with ¾-inch branch down on Kitchen wall to Laundry wash-trays, and ½-inch branch to pantry sink. Beyond the China-closet it is to divide into two ½-inch branches, extending to wash-basins in second-story chambers, without any circulation or expansion pipe.

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Put three finished brass stop-and-waste cocks on hot-water supply-pipes in China-closet, to shut off pantry sink and wash-basins in second-story chambers separately, at pleasure, and drain the pipes. Put two cocks of the same kind over Kitchen sink, to shut off the sink or the Bath-room fixtures.

Hot-Water Stop-and-Waste Cocks.

Furnish and fit up in Bath-room and two chambers in second story, where shown or directed, three best 16-inch white earthenware overflow ground wash-basins. Each to be supplied with hot and cold water through ½-inch pipe, and No. 4 extra silver-plated cast-tube compression basin-cocks; and to waste through plated socket and strainer, with plated plug and chain-stay, bolted to the marble, and plated safety-chain No. 1, 1¼-inch lead pipe to main wastes with 2-inch lead S-trap close to the outlet, and brass trap-screw, and 1¼-inch vent-pipe to main air-pipe. Connect the overflow with the traps by 1¼-inch lead pipe, entering below the water-line, to prevent circulation of air.

Wash-Basins.

Cover each basin with 1⅛-inch, best quality, blue-veined Italian marble slab, dished, with all free edges ogee moulded, and with ¼-inch wall-plates of the same marble, 15″ high, with ogee-moulded edges. Basins to be secured to marble with three brass basin clamps and bolts to each, and the joint to be made tight with plaster-of-Paris.

Furnish and fit up in Bath-room, where shown or directed, one 6-foot 20-oz. [*Steeger's*] tinned and planished copper overflow bath, to be supplied with hot and cold water through ⅝-inch pipe and ½-inch extra silver-plated compression bath bibb-cocks; and to waste through plated socket and strainer, with plated plug and chain-stay, and plated safety-chain No. 2, with 2-inch lead pipe to main waste, and 2-inch lead S-trap, with brass trap-screw and 1½-inch lead vent-pipe to main air-pipe. Connect the overflow to the trap by 2-inch lead pipe, entering below the water-line.

Bath.

Furnish and fit up in China-closet, where shown or directed, one [*Steeger's*] 24-oz. tinned and planished copper 14″ x 20″ flat-bottomed overflow pantry sink; to be supplied with hot and cold water through tall, extra silver-plated upright core compression pantry-cocks, with screw nozzle for cold water; and to waste through plated socket and strainer, and 2-inch brass Boston waste-cock, with silver-plated plate and lever, and 1½-inch lead pipe to main waste, with 4-inch round trap and 4-inch brass trap-screw, and 1½-inch lead vent-pipe to main air-pipe. Connect the overflow to the trap by 1½-inch lead pipe, entering below the water-line.

Pantry Sink.

Cover with 1⅛-inch best quality, blue-veined Italian marble slab, dished, with all free edges ogee-moulded, and with ¼-inch wall-plates of the same marble, 15″ high, with ogee-moulded edges.

Furnish and fit up in second-story Bath-room, where shown, one [*H. C. Meyer & Co.'s*] white earthenware Brighton water-closet, and wooden cistern, lined with 16-oz. tinned copper, 16″x 16″x 24″, inside measurement, with [*Meyer's*] 4-inch brass cistern-valve, brass compression or Fuller ball-cock and 4-inch tinned copper float, cranks, lever, and plated safety-chain No. 2, polished black handle complete, and 1¼-inch 2½-lb. lead pipe to basin, and 1¼-inch overflow carried into basin supply. To be connected to branch of soil-pipe by 4-inch lead pipe and brass ferrules, and a 2-inch lead vent-pipe to be carried from this pipe to main air-pipe. Connect the ventilation-pipe from back of closet by 1¼-inch pipe to range flue in chimney, making all tight.

Water-Closet, Second Story.

Furnish and fit up in Basement, where shown, one [*Hellyer's*] white earthenware short Artisan Hopper water-closet, with flexible metallic connection, and wooden cistern lined with 16-oz. tinned copper, 16″ x 16″ x 24″, inside measurement, with 24-oz. two-gallon service-box, brass compression ball-cock and 4-inch tinned copper float, and [*Meyer's*] 4-inch brass cistern valve, cranks and all attachments complete for automatic seat-supply with preliminary and after flush, and 1¼-inch 2½ lb. lead pipe to basin with 1¼-inch overflow connected to basin supply. To waste through 4-inch lead pipe to branch of soil-pipe, and a 2-inch lead vent-pipe to be carried from trap to main air-pipe.

Water-Closet, Basement.

Put Mott's enamelled iron slop-safe, of suitable shape, over bowl of each water-closet.

Slop-Safes.

Furnish and fit up in Kitchen, where shown or directed, one best-quality soapstone kitchen sink, 24″ x 48″ x 8″, with grooved soapstone draining shelf and soap-dish, and soapstone back 16″ high; to be supplied with hot and cold water through ⅝-inch pipe and ⅝-inch finished brass compression-cocks, the cold water cock to have screw nozzle; and to waste through 6-inch brass cesspool and strainer, and 2-inch lead pipe to main waste, with 6-inch round lead trap and 4-inch brass trap-screw, and 2-inch lead vent-pipe to main air-pipe. Sinks to stand on wooden frame furnished by the carpenter.

Kitchen Sink.

Furnish and put up in Laundry, where shown or directed, a set of four white earthenware wash-trays, of the Morahan Ceramic Co., one to have rubbing board formed in the porcelain. All to be set complete by the plumber, and each to be supplied with hot and cold water through ⅝-inch pipe and ⅝-inch finished brass compression wash-tray cocks. To waste through best 1½-inch silver-plated wash-tray strainers and couplings, with plated plugs, chain-stays, and plated safety chain No. 2, and to have one 6-inch round lead trap for the set of four trays, with 4-inch brass trap-screw, and separate 1½-inch lead waste-pipe from each tray, all entered into the trap below the water-line, with 2-inch lead outlet pipe from trap to main waste, and 2-inch lead vent-pipe from trap to main air-pipe.

Wash-Trays.

Supply the wash-boiler, to be furnished and set by the mason, with cold water only, through ⅝-inch lead pipe, carried through top of boiler and neatly finished, with ⅝-inch finished brass ground stop-cock on the pipe, in a convenient position over the boiler. There will be no waste to this boiler.

Wash-Boiler Supply.

Bore through the sill of house under middle of front bay, or elsewhere where directed, and put on outside a ⅝-inch plated compression sill-cock, with screw for hose.

Sill-Cock.

Furnish and fit up on pier next to furnace a ½-inch finished brass compression bibb-cock for drawing water.

Furnace Supply.

Line under all fixtures of every kind about the basement with 4-lb sheet lead turned up 2 inches all around, and to have convex brass strainer and 1-inch drip-pipes carried to basement and emptying over cistern of basement water-closet; the end of pipe to dip below water-line of cistern.

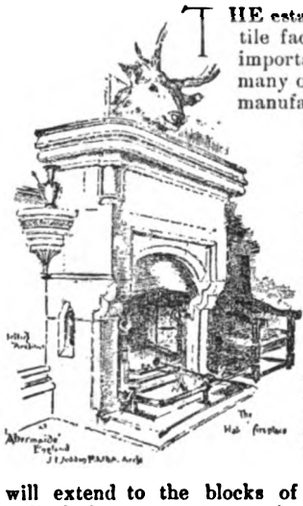
Safes.

All the work is to be done in the very best, neatest and most thorough manner, tested by turning the water onto each part. All defects made good at the completion of the building and all left perfect and warranted for two years.

As soon as the pipes and traps are ready the traps are to be filled with water, and the whole system tested by closing all air-pipes and other outlets, and pouring 5 ounces of oil of peppermint into the top of the main soil-pipe, followed by two or three gallons of hot water, and immediately closing the top of the soil-pipe. This is to be done in the presence of the architect or of some person appointed by him, and if any odor of the peppermint is detected in any part of the house the plumber is at his own expense to search for and find the defect or defects which may have allowed the vapor of peppermint to escape, and make them all good. After repairing the defects so discovered, the test is to be repeated in the same way, and any further defects so detected are also to be made good at the plumber's expense, until the whole is satisfactorily proved to be tight and perfect, and all work is then to be restored and replaced in good order; the whole cost of making such repairs, and of removing and replacing other work disturbed to obtain access to the pipes, with all expense of making good any damage so occasioned, and indemnity for delays to other contractors, to be paid by the plumber.

Peppermint Test.

MILL-BUILDING.[1]



THE establishment in New England of "textile factories" of any considerable size or importance is within the recollection of many of our older neighbors. To-day the manufacturing towns rival in number and importance the commercial ones, and mill-building thrives while ship-building declines.

To those not technically familiar with the subject it may seem strange that so much of the building of prosperous and enterprising manufacturing communities should be independent of the work of the architect. Up to the present time, however, with rare exceptions, the names "mill" and "factory village" have been synonymous with all that was hard, barren and aggressively ugly. No doubt in due time the improvement already begun in the dwellings and public buildings of mill towns will extend to the blocks of corporation tenements; but very radical changes must occur in the views of stock-holders and their servants before questions of taste will find a place with questions of utility and profit; and for many years there will still remain the immense piles of brick known as the "mills," the central interest of whole communities, representing millions of capital, and yet possessing but one solitary element of architectural effect, — the grandeur of vast extent and bulk.

Good architecture demands a liberality in the use of materials beyond the strict requirements of a short-lived stability: to be dignified it must be permanent. Decorated construction while honest and frugal must not be mean. The strict requirements of the civil and mechanical engineer will not suffice for the architect.

In the planning and construction of textile factories the conditions adverse to art have long had full sway. Not only are such buildings often meagre in construction, running as near the verge of disaster as bold and reckless speculation will warrant; but their whole arrangement, location and disposition of parts is controlled by machine

[1] *The Fire Protection of Mills and Construction of Mill Floors, containing Tests of Full-size Wood Mill Columns* By C. J. H. Woodbury, Member N. E. Cotton M'f'g. Association, Amer. Soc. of Mechanical Engineers, Inspector Factory Mutual Insurance Companies. New York: John Wiley & Son.

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rules that cramp and hamper the exercise of good taste and fill the mind of the prudent constructor with apprehension. Even the limited effects that might be obtained by the skilful grouping of masses are lost because this very arrangement must be governed solely by questions of convenience and safety from fire.

In addition to the demands of capitalist and machinist controlling this class of building, which are more or less familiar to every one, there is another important consideration, not perhaps so fully understood outside of manufacturing communities, and that is the extreme risks of fire incurred in this branch of manufactures. Among such risks may be noted the necessity for immense lofts without fire-resisting divisions, and with floors upheld by a forest of slender pillars of iron or wood; the distribution of materials of the lightest and most inflammable character; the use, in close proximity to these materials, of large numbers of gas or electric lights; the employment throughout of light machinery driven by power and liable at any moment to set fire to the material in process of manufacture; the free use of oil and the storage of materials extremely liable to spontaneous combustion; the great number of employees, the slightest carelessness of one of whom may result in a disastrous conflagration; the close grouping of many large structures around one source of power; the demand for strictest economy and a close balancing of risks against outlay; the temptation under many conditions to incendiarism. These and other reasons combine to create a very hazardous class of fire-risks, and to promote a kind of building which is strictly a mechanical construction.

It is the proper ambition of the good architect to build for all time. Anything which will enhance the lasting quality of his work must meet with his hearty approval. Even in the secondary consideration of his compensation his interest lies in the same direction. But the demands of a new and progressive civilization on the members of a profession not yet firmly established and thoroughly understood; the desire of clients for ornate and *bizarre* architectural effects, as means of profitable investment or material for the gratification of personal vanity and love of vulgar display, tend to promote a class of work that the conscientious architect must often condemn; but his duty ends with the plain statement of his disapproval to the parties by whom he is employed; or in extreme cases with his withdrawal from the work, at a personal and uncompensated sacrifice. He is not the guardian of the public safety but a paid servant of an individual or corporation. With those who disregard his serious counsel rests the responsibility of such disregard. The professional work in promoting permanent and fire-resisting building would, however, be comparatively easy, were it not for the steady influence of the insurance interest in the opposite direction. In the absence of any proper discrimination in favor of good work the owner finds it cheaper to insure largely than to build well. If building estimates seem high it is the provisions against fire that are sacrificed, on the too often well grounded supposition that insurance rates will not be materially increased. Extra hazardous risks combined with clever appliances for the extinguishment of fires are the temporary necessities of a low order of building. Good architecture, for its proper development, requires peace and security. The present interest of the underwriter is to foster a state of alarm and apprehension. When good building becomes the rule fire insurance and fire-engine companies will have become reminiscences of an imperfect civilization.

In the present condition of textile factories the underwriter finds congenial surroundings; but the risks are so great at the best that the cost of stock insurance has led to the establishment of mutual companies with stringent regulations and steady and continued efforts to lessen the unusual risks encountered by the erection of an exceptional class of buildings, and the introduction of automatic and other appliances for fire extinguishment. The exigencies of the case have given the planning and construction of these mills into the hands of a class of specialists, variously known as "mill architects," "engineers" and "mill builders," who aim to supply the demand as it exists, and who often display great skill in doing so.

Although the architect may find little or no regular employment in connection with mill-building, he can but take a lively interest in it as an important class of construction, and find many valuable suggestions in any careful record of the results of the experiments and experience of the specialists who have such work in charge.

The volume under consideration is naturally divided into two sections, each occupying about half of the book; the former devoted to the "fire-protection of mills," and the latter to "mill construction." The whole forms a clear and concise statement of the experience of a practical man, and cannot fail to be of use to all practical men; but perhaps its greatest usefulness will be in the new mill districts of the West and South, where it will carry the result of many years of expensive experiment of the older manufacturing districts of New England. The relation of the treatise to underwriting is stated to be "an indirect one, being addressed to the manager and builder." In the simple principles laid down for the prevention and control of fires the author takes similar views to the best authorities on such matters. Starting with the assertion that "a fire-proof mill is a commercial impossibility," great weight is given to the element of human agency in causing and preventing fires, and the pail is ranked first as a fire-engine. This importance given to simple implements in ready hands is fortified by the oft-repeated and oft-forgotten truism that "it is an exceptional fire that could not have been extinguished in its earlier stages." Following in the same vein he states that "the greatest losses are due to the failure of apparatus at the critical moment," and dwells upon the vital importance of giving regular "instruction in the use of apparatus by actual trial and work." This principle may well be extended to other fields of usefulness besides mills. Numerous water supplies and independent appliances are also noted as elements of safety.

On the subject of pumps, hydrants, valves, and hose much information of value to an architect is given; and here a preference is again shown for long tried and simple machinery over many later and more complicated devices.

The usefulness of the "factory sprinkler," so called, has been so much discussed of late that it is more or less familiar to all experts in building. The old arrangement of a net-work of perforated pipes, on to which the water was turned by a hand valve, was open to several serious objections, which have been mostly overcome by the introduction of automatic sprinklers which, by the action of heat on fusible plugs or connections, turn on the water in the form of spray at points where the fire is in progress and nowhere else. This device economizes the water, and is independent of human control. The net-work of pipes and distributing heads are liable in course of time to be clogged by rust or impurities in the water; but trouble from such causes can doubtless be avoided by frequent inspection. Of course the automatic pattern would be worse than useless where liable to the action of frost; as for instance, over the stage of a theatre, a use for which it has been suggested. For such a locality the original arrangement of Mr. James B. Francis, of Lowell, is the best, the water being turned on to the pipes from below when required. It is a satisfaction to be confirmed by so good an authority in the preference that many architects have shown for fire-shutters of wood covered with sheet-metal, over any kind of all metal shutters. Careful directions for their construction are given which will be found useful in specifications. It is also well to be assured of the fact that steam-heating pipes will set fire to wood in contact, a matter that has been the subject of much controversy.

The pages devoted to electric-lighting are clear and comprehensive, and in the one estimate of relative cost of lighting by the old and new methods the results are very unfavorable to gas, and this without counting the superiority of the electric-light for all work in which the arrangement of colors bears a part.

Valuable formulas for use can only be deduced from extended experiment, and here the very peculiarity of the mills, the acres of roofs and floors, the forests of columns, the rattle and jar of hundreds of engines and thousands of looms, give opportunity for a thoroughness of investigation and classification of results of the greatest value and interest in other building. The late experience in covering flat roofs with canvas, or cotton duck, painted or tarred after laying is novel and suggestive. The suggestions for arrangement of pillar connections through floors and girder-bearings in walls are good, but the experiments in the strength of wooden pillars are too limited to be of any great value. It is a reproach to the mill interest that this *practical* question is not made the subject of a series of exhaustive experiments that will give reliable data. A larger part of the mills now standing, and some that have fallen, depended on nothing much more reliable than the rule of thumb for the strength of their principal supports.

The student will find in this little volume many matters for which he may have searched ordinary text-books in vain: the causes and results of oscillation and vibration; the weight of certain machinery; the weight per cubic foot of many kinds of fabrics and materials in bale or package; the stiffness and strength of plank and girder floors, and many kindred matters are set forth in a clear and concise manner.

Although it may not be the lot of all architects "to know many things and know them all well," and although talents like those of Wren and Viollet-Le-Duc may fall to the lot of few, it is well for all to consider the words of this practical writer that "utility is the fundamental element in design, the fitness of means to ends being paramount to other considerations." The true architect must be a builder: without a thorough knowledge of sound construction his ever so clever pencil is that of the draughtsman only.

MEASUREMENTS OF THE GREAT LAKES. — The following measurements of the great lakes have been taken by Government surveyors: The greatest length of Lake Superior is 335 miles; its greatest breadth is 160 miles; mean depth, 688 feet; elevation, 827 feet; area, 82,000 square miles. [The combined area of the six New England States is only 65,038 square miles.] The greatest length of Lake Michigan is 300 miles; its greatest breadth, 108; mean depth, 690 feet; elevation, 506 feet; area, 23,000 square miles. [Denmark, which has somewhat the same configuration, in reverse, contains exactly the same number of square miles.] The greatest length of Lake Huron is 300 miles; its greatest breadth is 60 miles; mean depth, 600 feet; elevation, 274 feet; area, 20,000 square miles. The greatest length of Lake Erie is 250 miles; its greatest breadth is 80 miles; its mean depth is 84 feet; elevation, 261 feet; area, 6,000 square miles. [Connecticut and Rhode Island together contain 5,980 square miles.] The greatest length of Lake Ontario is 180 miles; its greatest breadth is 65 miles; its mean depth is 500 feet; elevation, 261 feet; area, 6,000 square miles. The total of all five is 1,265 miles, covering an area of upward of 135,000 square miles. [Great Britain and Ireland contain only about 120,872 square miles.]

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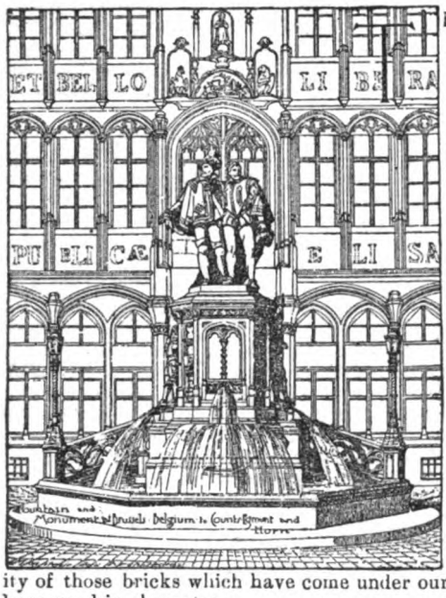
IRON AND OTHER SLAGS.[1]



THE numerous attempts to utilize this abundant waste have been attended with varying success, and although some satisfactory results have been reached through direct treatment of the incandescent mass as it leaves the furnace, no very marked progress has been made in what may be called the "concrete proper" direction. At Middlesborough-on-Tees extensive operations have been for some years carried on in the manufacture of slag-bricks, but owing probably to the imperfect cementing agent used, the quality of those bricks which have come under our observation has not been good in character.

In Germany the manufacture of bricks from slag has been going on for upwards of twelve [now fifteen] years, and at Osnabrück more particularly the industry has been of a progressive character. In 1866 about half a million of bricks were made, and in 1875 upwards of six millions and a half.

The cost of producing these bricks was 16*s* per 1,000, the lime mixed with the granulated slag costing 3*s*. 4*d*. of that amount. In the early experiments the machinery for compressing the bricks was found to suffer much damage from the hard and gritty nature of the slag: this difficulty has been completely overcome by the machines invented by Mr. Lurman.

Many structures have been built in Germany of these slag-bricks, and the testimonials received from architects and others interested testify as to the advantages derived from their use.

In two sets of experiments made to test the compressive strength of slag-bricks, made in two different districts, the following results were obtained: —

OSNABRUCK BRICKS.

Average of ten bricks, 1871 make, were crushed with a pressure of 1487.72 lbs. per square inch.

Average of ten bricks, 1873 make, five months old, were crushed with a pressure of 1571.63 lbs. per square inch.

SIEGEN BRICKS.

Bricks made from granulated slag mixed with naturally disintegrated dust broke under a pressure of 2648.30 lbs. per square inch.

Bricks of granulated slag only were crushed with a pressure of 2109.26 lbs. per square inch.

These experiments were made for the purpose of comparing their strength with local red and pale, hard and soft burnt clay bricks, and in every case slag-bricks exceeded them in compressive value.

Experiments were made in 1874 to test the capacity of these slag-bricks to resist the action of heat, and it was found that they remained perfect when red-hot, thus proving their suitability for chimneys and furnace work.

In the investigations connected with this industry a series of experiments were made under the direction of Professor Pettenkofer, of Munich, and the results are so generally interesting that we quote them below.

The primary object of the experiments was to test the permeability of the slag-bricks to air and water. The pressure of air applied was 0.0108 kilo. per square centimetre, and it was found that through every square metre of the following materials the quantity of air in litres passed through per minute was: —

	Dry.	*Soaked.*
Concrete	15.5	.0
Green sandstone (Upper Bavaria)	7.8	1.4
" " Switzerland	7.1	2.1
Tufaceous limestone	478.8	233.2
Hair-mortar	54.4	3.9
Portland cement	8.2	.0
Slag-brick (Osnabrück, 1871)	93.0	53.8
" " "	105.0	15.4
" " 1873	110.4	10.2
" (Haardt, 1873)	455.8	41.0
" (English, 1876)	158.0	1.1
Clay-bricks, (pale) Osnabrück	23.3	5.1
" (slightly burnt, hand-made Münich)	9.6	1.5
" (machine-made Münich	7.9	1.7

By the same experiments it was found that clay-bricks were completely soaked with water in from 9 to 12 hours, whereas it took from 55 to 190 hours to saturate a slag-brick.

A hospital at Georg-Marien-Hütte was built during 1870–1871, of these slag-bricks. It was opened in 1872, and in June, 1876, the medical superintendent testified to its salubrity. There is accommodation within its walls for thirty-two patients, twenty-eight being comfortably placed in four spacious wards, and four in separate small rooms. The walls are hollow, having an air-space of 2½", and so successful is the result that no smell of hospital-air is observable even in the rooms where offensive suppurating wounds are treated. All these advantages are derived from "the extremely advantageous porosity of the slag-bricks."

This new and valuable feature of porosity is entitled to some attention in this country [England] as we usually disregard the advantages to be obtained in this direction, and too frequently aim at an air-tight house.

We need not further refer to the various less important aggregates, except to caution intending concrete-makers against using broken bricks, old plaster, and any rubbish which some writers on concrete recommend for house-building purposes. There is just as much care required in the selection and treatment of the aggregate as the matrix, and unless this is carefully borne in mind, there is not any chance of much success in the concrete mixture.

[1] From Henry Reid's Treatise on Concrete, p. 121.

THE ILLUSTRATIONS.

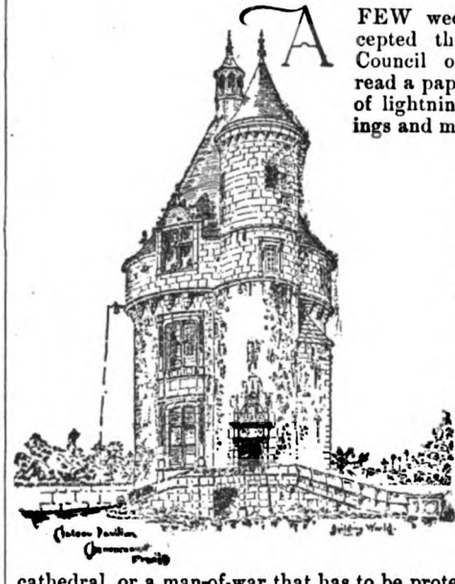
LINCOLN PARK REFECTORY, CHICAGO. MR. W. L. B. JENNEY, ARCHITECT, CHICAGO, ILL.

THE new refectory, just completed, is situated on the shore of the lake, with office for renting boats on platform over the water. The exterior is painted in rich colors, the body olive-green trimmed with terra-cotta red, with mouldings of cherry; the under side of roof projections sky-blue, the rafters in russet-brown, and the upper panels in neutral orange. The lower story is a lunch-room, with kitchen, storerooms, cool-rooms, etc. The upper story is for a restaurant, and is finished in open-timber work, painted in steel, red, brown and orange, — the orange being the prevailing tint, giving a rich warm glow to the whole room.

DESIGN FOR A DINING-ROOM INTERIOR. MR. E. G. W. DIETRICH, ARCHITECT, BROOKLYN, N. Y.

"REDSTONE," SHORT HILLS, N. J. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

ON THE PROTECTION OF BUILDINGS FROM LIGHTNING. — I.[2]



A FEW weeks ago, when I accepted the invitation of the Council of this Institution to read a paper on the application of lightning conductors to buildings and magazines, it never occurred to me how difficult would be the task to deliver an *interesting* paper on so special a subject, or a paper that would be of value to a purely naval and military institution. It is, however, only too true that lightning strikes soldiers, sailors, and civilian alike, and that the laws which should govern the application of conductors are the same whether it be a palace or a jail, a chimney, a cathedral, or a man-of-war that has to be protected. Moreover, the immense interests jeopardized by any faulty arrangements, which might occasion the explosion of magazines, makes the subject of special importance to naval and military men. Imagine the loss to the war strength of the empire which would be entailed by the accidental explosion of one of the large magazines at Tipner or at Priddy's Hard, with its charge of, say, 750 tons of gunpowder, or over 750 millions of foot tons of energy developed in less than one second of time, and this within a short distance of the greatest naval arsenal in the world and a town with 120,000 inhabitants. Every building-shed would be levelled to the ground and the town would be visited as was Chios the other day. The proper application of lightning-conductors to large magazines and to men-of-war is evidently, therefore, a matter of importance to us all.

Electricity exists in two distinct forms, the static and dynamic, but the word static thus applied is somewhat misleading, because electricity (like heat) is now recognized to be a form of matter in motion, whether in the state of potentiality, as in a thunder-cloud, or in the state of activity (the work-producing state), as in lightning.

[2] By Capt. J. T. Bucknill, R. E., from the "*Journal of the Royal United Service Institution.*"

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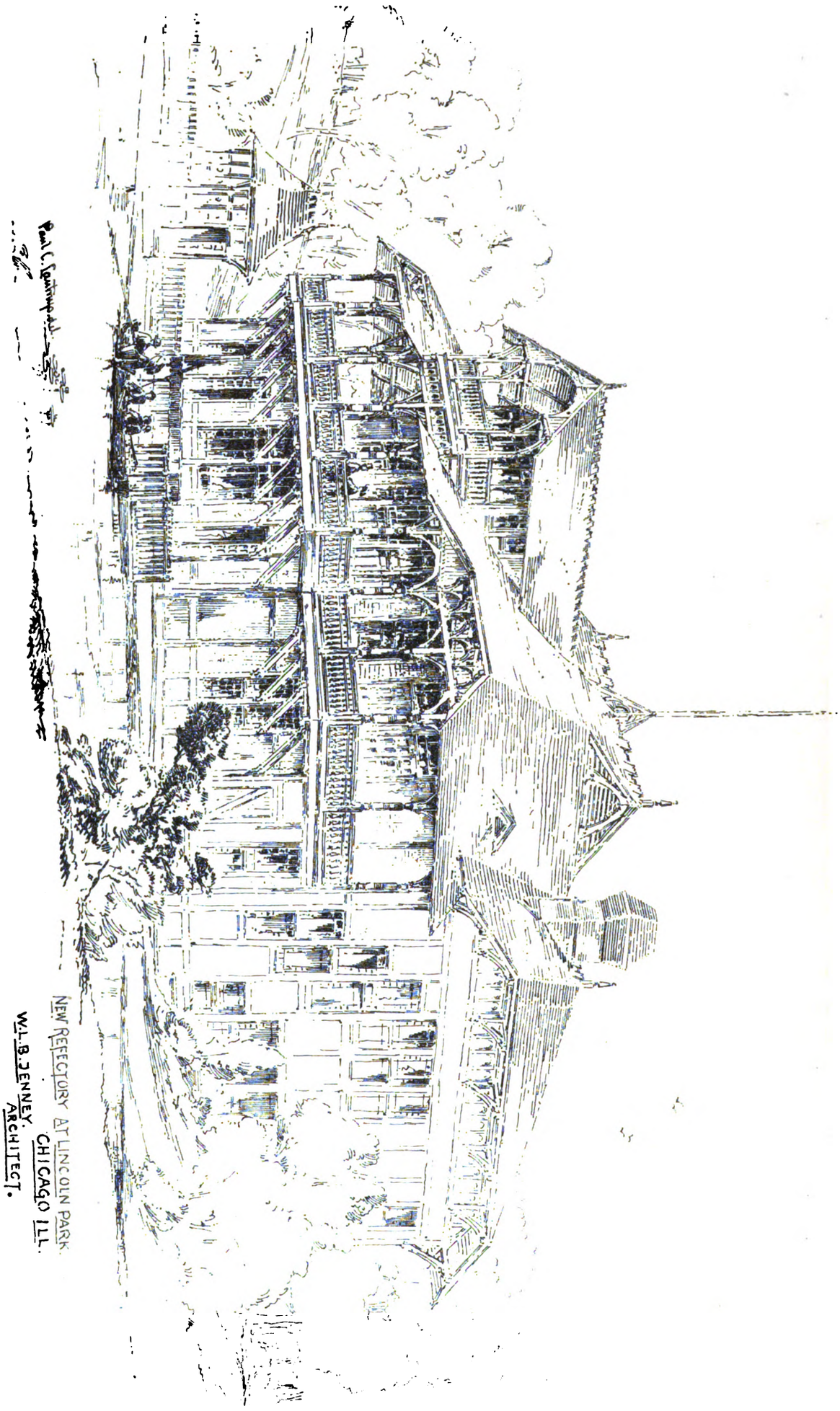

NEW REFECTORY AT LINCOLN PARK CHICAGO ILL.
W.L.B. JENNEY. ARCHITECT.

The Heliotype Printing Co. 211 Franklin St. Boston.

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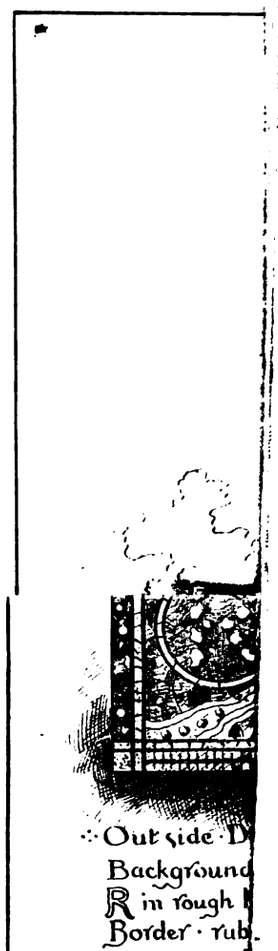

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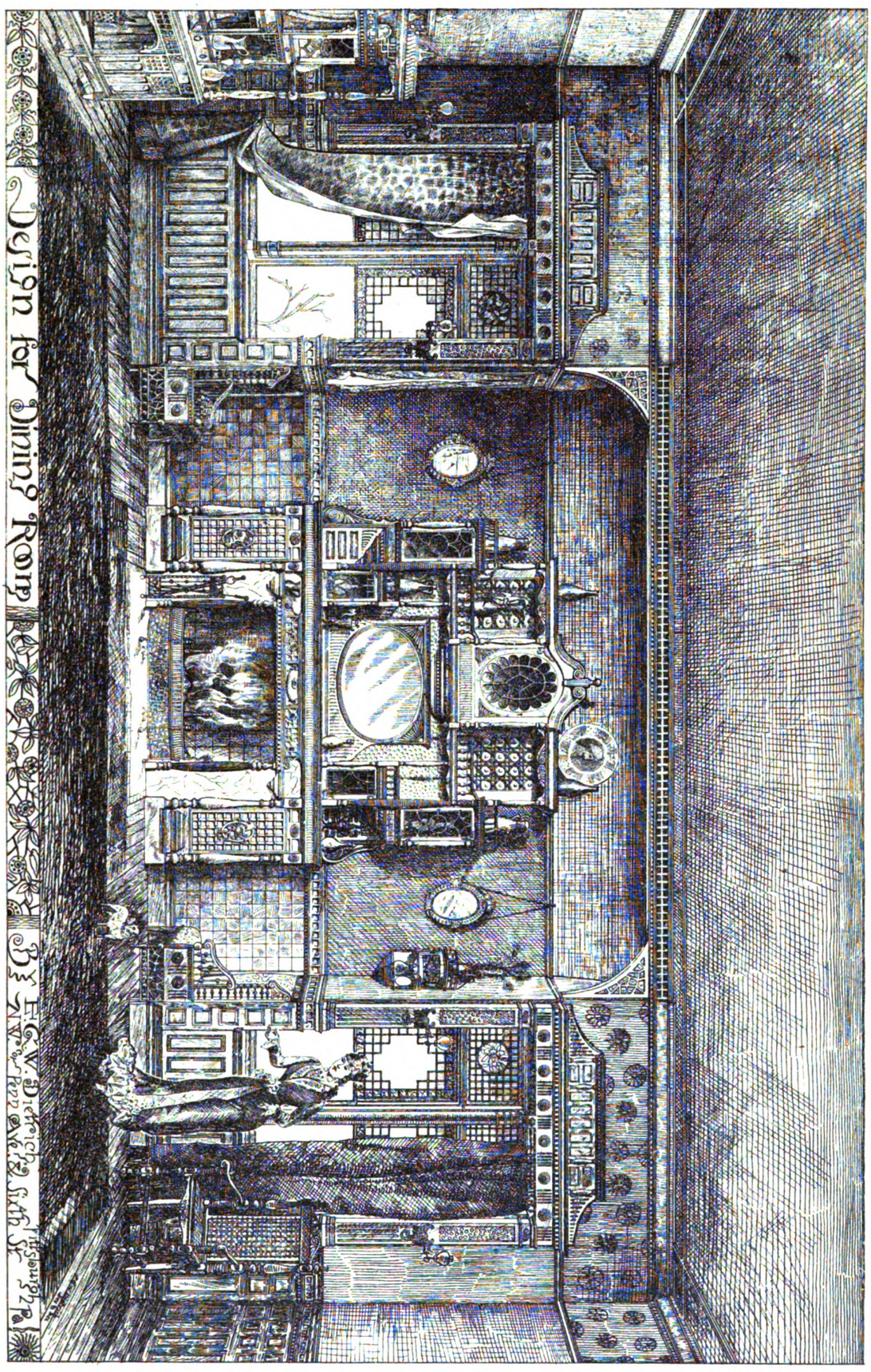

Design for Dining Room
By E. W. Bruce, Esq.
Pittsburgh, Pa.

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How the former is produced is still conjectural, although a multitude of theories have been propounded.

In whatever manner the electricity is produced the thunder-clouds act as collectors, and more than this, when the surface of the earth beneath them is not far distant and is composed of fairly good conducting media, the earth, the clouds, and the intervening air form huge condensers: the electrified clouds acting by induction upon the earth, and the latter reacting upon the cloud.

Now the amount of electricity of given potential which a cloud is capable of receiving depends first upon its size, the amount varying directly as the linear dimensions of the cloud; and, secondly, upon the intensity of inductive action of the earth's surface, the cloud's power of receiving electricity being greatly increased thereby.

For example, a cloud of given dimensions at an altitude of 300′ could be charged by eighty times the electricity that could charge it were its altitude increased to four sea miles. For a similar reason a cloud over a conducting area could be charged much more highly than the same cloud at the same height over a non-conducting area.

One of the most remarkable of the phenomena connected with electricity is the mutual attraction of bodies charged with electricity of opposite sign, and the mutual repulsion of bodies charged with electricity of like sign. Now the charges on inducing and induced surfaces are always of opposite sign. The bodies possessing these surfaces consequently attract each other. If, therefore, thunder-clouds be driven by the wind or otherwise over portions of the earth's surface which vary considerably in their conducting power, they will be attracted to those regions which from their conductivity present the greatest facilities for inductive action; and this, in spite of the mutual repulsion of the clouds, just as the numerous admirers of a beautiful woman, although hating each other are attached to her.

Now it generally happens that the thunder-clouds in a storm are sufficiently numerous to cover both favorable and unfavorable areas of the earth's surface, and, as little or no inductive action occurs over the latter, but very considerable action over the former, the electrostatic capacities of the clouds become greatly altered and lightning plays from cloud to cloud, until those which are situated over the earth's conducting surfaces become so highly charged that the electricities are able to overcome the resistance of the intervening air and to unite across it by what is termed the disruptive discharge: this is lightning.

I have been thus particular in describing the action produced by the earth's surface upon thunder-clouds because the somewhat important conclusion must be arrived at that lightning is most to be feared by those who live on well-conducting areas, even of low elevation, and that lightning is least to be feared by those who live on non-conducting areas. This is shown on plate, Figure 9, where the

distribution of the electrical charge is shaded in. The cloud over the Portsdown Hill, although nearer to the ground is much less highly charged than the cloud over Portsmouth and Spithead, because the former presents a non-conducting area. This electrical distribution is of considerable importance, and it shows that it is much more necessary to provide lightning-conductors for buildings situated upon a damp clay or boggy bottom than for those on a chalk down. This is very convenient, for it is almost impossible to make an efficient earth connection in the latter situation.

As before stated, disruptive discharge constitutes a lightning flash. Immediately before the stroke the particles of air are subjected to a high strain by static induction, producing a polar tension which is proportional to the square of the potential. Faraday's experiments proved this, as well as the fact that the stroke tends to traverse the air in the direction of such polarity. The tendency of lightning is therefore to strike in a direction normal to the earth's surface.

But there is another mode by which thunder-clouds are discharged, viz.: by the brush discharge. Electricity of high potential leaks, as it were, from conductors which are provided with projections in the nature of points, where the distribution of electrical density is greatest, a stream of electrified air being thrown from each point, and the charged conductor robbed by continuous streams of its electricity in this manner.

Although the brush discharge is frequently so intense as to be luminous to a height of 6″ or 8″, it is not attended with any appreciable heat. Its action should therefore be fostered, as it often wards off a dangerous stroke of lightning by neutralizing the opposing electricities in a harmless manner.

It has been observed so late ago as 1758, by a Mr. Wilcke, that a thunder-cloud, in sweeping at low elevation over a forest, not unfrequently appears to lose charge without the occurrence of lightning. The under surfaces of such clouds at first present a serrated or tooth-like appearance, which gradually disappears, the teeth retreating into the cloud, and finally the cloud itself rising away from the forest. In such cases the numerous points on the branches of the trees present facilities for the brush discharge on an extended scale.

To illustrate this action, an experiment was made by Franklin, as follows: a very fine lock of cotton was suspended from the conductor of an electric machine by a thread, and other locks were hung below it; on turning the machine the locks of cotton spread forth their fine filaments like the lower surface of the before-mentioned thunder-cloud; on presenting a point which was connected to earth below them, they shrank back upon each other and finally upon the conductor.

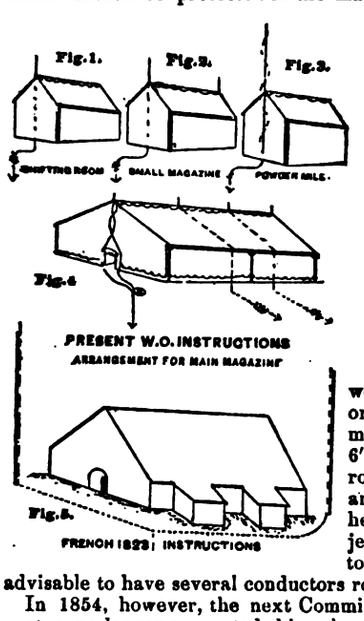
But to return to the lightning. Just as a certain amount of water falling through a difference of level produces a definite amount of energy, so a certain amount of electricity falling through a difference of electrical potential produces a definite amount of energy. It is known that if p be the potential and q the quantity of electricity in a flash, the work done during the stroke is $\frac{1}{2}\,qp$. Now the duration of the illumination of a stroke is rather less than the ten-thousandth part of a second, and although q is small (Faraday said not more than would decompose a single drop of water) p is so enormous that the flash is often capable of decomposing a million drops of water in series. The potential can be calculated approximately because it is known that ten thousand volts will spark across a little more than half an inch at ordinary atmospheric pressure; and, as the sparking distance varies as the square of the potential, a flash of lightning 1,000′ long must be impelled by an electrical potential of one and a half millions of volts or thereabouts. This is only approximately accurate, because the mean atmospheric pressure would be less than that at the earth's surface, and therefore a correction should be made, as the pressure of the atmosphere decreases very rapidly with altitude, and the sparking distance increases very rapidly with decrease of atmospheric pressure. The work $\frac{1}{2}q$ done by a flash of lightning is used in the disruption of the air, in the destruction of non-conducting solids that obstruct its path, in heat, in light, and in chemical decomposition. Ozone is always produced during thunder-storms.

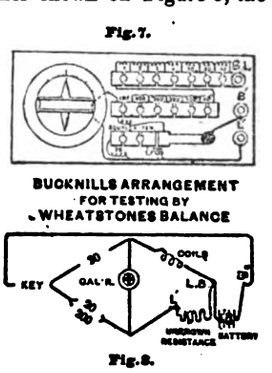
All that can be done to protect buildings from its destructive action is (first) to attract the lightning to another spot if possible, and (second) to arrange that even if the building be struck the work shall be given out at other portions of the path of the stroke. To do this it is necessary to provide a sufficient conducting channel or channels to convey the electricity past the buildings from the air to the ground.

Firstly, let us examine the methods which have been pursued for attracting lightning away from the building which it may be desired to protect. The French Académie des Sciences has issued information concerning lightning-conductors on different occasions, the several instructions having been the results of the labors of various commissions of celebrated physicists.

In the first instruction, 1823, with Gay-Lussac as reporter, the rule is laid down that *a conductor will effectually protect a circular space whose radius is twice the height of the rod*, and it is stated to be in accordance with calculations made by M. Charles.

Accordingly we afterwards find in the same instructions that magazines should be protected in the manner shown on Figure 5, the





wording being: "The conductors should not be placed on the magazines, but on poles at from 6′ to 8′ distance. The terminal rods should be about 7′ long, and the poles be of such a height that the rod may project from 15′ to 20′ above the top of the building. It is also advisable to have several conductors round each magazine."

In 1854, however, the next Commission, with M. Pouillet as reporter, no longer supported this rule. The report says:—

"At the end of the last century it was a generally accepted opinion that the circle protected by a conductor possessed a radius equal to twice the

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height of the point. The Instruction of 1829 (Gay-Lussac, *rapporteur*), having found that practice established, adopted it with certain reservations. . . . These rules . . . rest on much that is arbitrary" . . . "and they cannot be laid down with any pretense to accuracy, since the extent of the area of protection in each case is dependent on a multitude of circumstances."

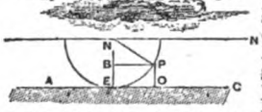
It is the more necessary to make this quotation, because an attempt has recently been made by Mr. Preece to revive the theory in a modified form. In a paper which he read before the British Association last year he attempted to prove that: —

A lightning-rod protects a conic space whose height is the length of the rod, whose base is a circle having its radius equal to the height of the rod, and whose side is the quadrant of a circle whose radius is equal to the height of the rod.

His argument was similar to, but not of such general application as that used by M. Lacoine in a somewhat remarkable paper read 20th June, 1879, before the French Société de Physique, from which the following is extracted: —

"Experience shows that a thunder-bolt has a tendency to fall on the metallic portions of a building. If, then, by the assistance of a lightning-conductor we are enabled to protect a certain metallic surface, much more, therefore, will the same conductor protect the same surface if non-metallic.

Fig. 10.



"Let N, Figure 10, represent a thunder-cloud situated over the surface AC to be protected. Assume that the cloud is at such a distance from the point P of the lightning-conductor PO, that the circle described from N as centre with NP as radius will be tangential to the surface AC. Then the cloud will be equally attracted by the points P and E,* because these points are at the same potential, this rule having always been admitted in all the instructions of the Académie Française. Consequently every point on the surface AC within the circle with radius OE will be protected, but every point outside E towards A would be unprotected.

"Hence the radius of protection $r = \sqrt{NE^2 - NB^2}$, NE being the height of cloud above the ground, NB being the height of cloud above the conductor.

"It is enough, then, to know the height of the thunder-cloud, to know the radius of action of a certain conductor.

"By several years' observation, and by direct measurement, the average height of thunder-clouds could be obtained, and the mean value of r for any given conductor deduced therefrom."[2]

Mr. Preece does not work out any such formula, but bases his rule on an assumption that a thunder-cloud would never be nearer to the earth than the height of the lightning-rod. This is open to question, as very low-lying thunder-clouds may be driven by the wind into the neighborhood of lofty conductors that command the clouds, and this is corroborated by a case recorded in Mr. Anderson's excellent book on lightning-conductors, page 67, where the belfry of an edifice, 115′ high, "remained standing out clear above the electric cloud" whence issued lightning that killed two priests near the altar of the church. As a single application Mr. Preece's rule comes at once from M. Lacoine's formula.

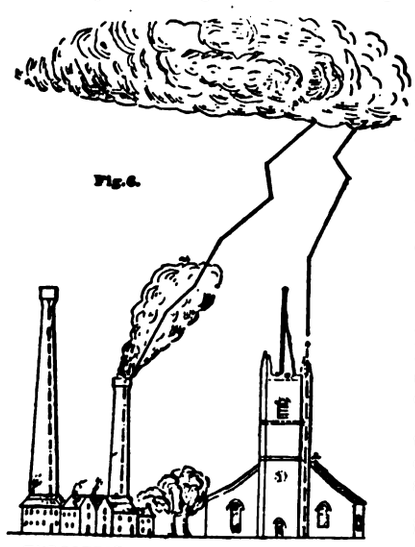
It is perhaps important to bear in mind these theories concerning the area of protection given by conductors, when it is necessary to fix a few conductors on buildings of considerable extent, such as barracks, hospitals, etc.; but sufficient reliance cannot be placed upon the rule to enable us to consider the protection to magazines as shown on Figure 1, and already alluded to, as efficient.

The area of protection afforded by a conductor depends much more upon the efficiency of the earth connections than upon the height of the terminal point, and in proof thereof many instances might be cited. For example, in the case of Shelton Church, in the Potteries, which was struck on the 10th June, 1880, the tower, about 16′ square, is surrounded by four pinnacles 16′ above the roof, which is nearly flat and covered with slates, with lead guttering and ridges. From the centre of the roof springs a large flag-staff, about 40′ high (see Fig. 6), secured to the tower in the upper chamber, 20′ below the roof by large cross-beams unconnected, except by stone-work, with the clock-work, bells, and gas-pipes in the chambers of the tower. A copper wire rope $\frac{3}{8}$″ diameter, is fitted to one pinnacle and taken direct to earth. Although the flagstaff projects some 20′ above the conductor, and is distant only 10′, a very heavy stroke of lightning, which caused much alarm, and which was seen to fall upon the tower, struck the conductor, knocked the point slightly out of the perpendicular, and passed off by it innocuously. In this case a good conductor, well connected to earth, protected something higher than itself, but not well connected to earth.

Again, Sir William Snow Harris mentions a chimney at Devonport which, although provided with a conductor, was struck on the other side, and shattered down to the level of a metal roof below. Here the conductor must have been badly connected to earth, and was useless.

Moreover, the safe area rule may be upset in practice by all sorts of accidental circumstances. Thus, a house within the theoretical circle of protection given by a church-spire close at hand might be struck if the line of least resistance from cloud to earth were afforded by a column of rising smoke from the kitchen fire, and the shorter of the two chimneys in Figure 6 would most assuredly be struck, for a similar reason, although it is within the theoretical cone of safety of the taller chimney as fixed by Mr. Preece.

Fig. 6.



In short, if thorough protection be desired for any building, it is necessary to put a conductor or conductors upon it.[3]

Let us now examine the manner in which conductors should be applied.

Churches and dwelling-houses of ordinary dimensions, factory chimneys, monumental columns, etc., need but one conductor led from the most lofty point to the ground, to which a thoroughly efficient earth connection (to be described presently) must be given. As a rule it is the best plan to fix the conductor externally, in which case it should be connected to all *external* metal surfaces, but *not* to any masses of metal wholly within the building. It should be fixed to the exterior by strong clamps of iron or other metal, and provision should be made for its expansion and contraction due to differences in temperature. It should be continuous from top to toe. It should possess a proper amount of conducting power per unit of length.

As regards the last-mentioned and most important matter of conductivity, the last French instructions, dated 14th February, 1867, state that there is no case on record where lightning has fused a square bar of iron having a square of 0.6″, or a section of 0.36□″ and square iron conductors of 0.8″ side are recommended, which gives a section of 0.64 □″. Also Sir William Thomson considers that a round iron bar 1″ diameter would form a very safe protection for magazines; this would be about 0.77 □″ sectional area. It would appear that continuous iron conductors weighing 6 lbs. per yard would be quite safe, as shown in the following table: —

Table A.

	Iron Conductors.		
	Side.	□″	lbs. per yd.
Limits of safety — French instruction	□ 0.6″	0.36	3 6
Conductors recommended by ditto — from	□ 0.75″	0.56	5.6
to	□ 0.8″	0.64	6.4
Sir William Thomson recommended	O 1.0″	0.77	7.7
New W. O. Instructions	..	0.8	8 0
Now proposed for general purposes	..	0.6	6.0

Now iron has about one-seventh, and good commercial copper about four-fifths of the conductivity of *pure* copper. Hence iron has about one-sixth conductivity of good commercial copper. A safe conductor in good copper must therefore weigh 1 lb. per yard.

It is, however, inconvenient to specify for a conductor either by sectional area or by weight per yard, because different samples of metal, and especially of copper, vary considerably in their conducting power. See table.

* This is open to doubt: the electrical charge on the cloud is attracted by the induction of an opposing *surface*, the total attraction being proportional to the sum of the tubes of force existing between the two opposing surfaces, charged by inductive action. To assume that the charge on a thunder-cloud is concentrated at a single point is not in accordance with the circumstances of the case in nature.

Faraday's experiments have conclusively proved that static induction polarizes the particles or molecules of the interposing di-electric, and that dynamic currents tend to traverse the same by disruptive discharge in the direction of the said polarity.

Assuming therefore that a lightning flash from the charged surface NN′ occurs at N, it will have a tendency to follow the direction NE rather than the alternative route NP, because polarity exists between NE to a greater extent than between NP.

This consideration will cause the theoretical circle of protection advocated by M. Lacoine to be considerably diminished when the charged cloud lies low, but when the cloud is at a considerable altitude NP becomes more nearly normal to the surface AC, and more nearly parallel to the direction of polarity of the atmospheric particles.

[2] As the height of thunder-clouds varies enormously, the values for r would range between proportionately wide limits, and the *mean* value of r obtained by M. Lacoine would seem to possess no definite or practical utility. If, however, the observations were directed to observing the minimum altitudes of thunder-clouds in each locality (the altitudes will be found to vary with the locality) the smallest areas of protection given to conductors there situated could be approximately established.

[3] A lamentable result of the practice of placing lightning-conductors distant from a building occurred at Compton Lodge, in Jamaica, the residence of J. Senior, Esq. A lightning-rod, of small dimensions, of iron, had been set up within ten feet of the southeast angle of the building, as used to be the practice with gunpowder magazines, on the assumption that the rod would attract the lightning and secure the building. So far from this, the building itself was struck in a heavy thunder-storm, 28th July, 1857. The southeast angle was shattered in pieces; the escape of the family appears to have been miraculous, whilst the lightning-rod, ten feet distant, remained untouched. If this building had been a deposit of gunpowder it would certainly have blown up.

Sir Wm. Snow Harris said: "To detach or insulate the conductors is to run away from our one principle, which is, that the conductor is the channel of communication with the ground, in which the electrical discharge will move in *preference to any other course*. To detach or insulate the conductor is to provide for a contingency at once subversive of our principle. Is it possible to conceive that an agency which can rend rocks and trees, break down perhaps a mile of dense air, and lay the mast of a ship weighing eighteen tons in ruins, is to be arrested in its course by a ring of glass or pitch, an inch thick or less, supposing its course were from any cause determined in that direction?"

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Table of conducting power of different descriptions of copper: —

TABLE B.

Pure copper	100
Lake Superior	98.8
Commercial	97.6
Burra Burra	88.7
Best selected	81.3
Bright wire	72.2
Tough	71.0
Demidoff	59.3
Rio Tinto	14.2

Temp. about 15° C. or 60° F.

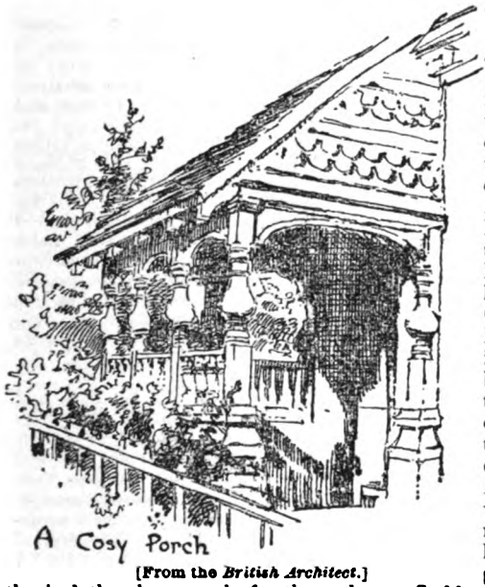
Imagine a conductor made of Rio Tinto copper! No doubt many exist.

A limit of electrical resistance per unit of length should therefore figure in any contract for a lightning conductor, and for the conductors already recommended this limit would be 0.3 ohm per 1,000 yards, or 0.03 ohm per 100 yards at 60° Fahrenheit or 15° C.

This would be obtained from iron wire rigging ropes weighing 6 lbs. per yard, or from copper (equal to 80 per cent pure in conductivity) ropes weighing 1 lb. per yard.

When two "earths" are used, and the conductor is carried up one side and along the ridge and down the other side of the building to be protected, it is evident that the conductor may be reduced in power by one-half, but no further reduction can be made when a still greater number of "earths" are used, because the lightning may strike the system of conductors at any point. A 3-pound iron (or a half-pound copper) rope is therefore the smallest that should ever be used in any situation.

BELLEGARDE.



[From the *British Architect*.]

AS an illustration of American enterprise and energy in Europe we call the attention of our readers to what has been accomplished by an American at Bellegarde and the Perte du Rhone. About an hour by rail from Geneva the Rhone, after having mingled its blue waters with the gray waters of the Avre, enters a narrow deep gorge. From the railway, which follows the river, you can hear the waters groan and roar in the bed they have made for themselves. Suddenly the stream disappears to reappear some hundreds of yards further on—hence the name, Perte du Rhone (Loss of the Rhone). The village where the return occurs is called Bellegarde, a place of indifferent aspect, but promising to become an industrial centre, and probably a large city. Strangely enough, the transformation will be as much the outgrowth of American ingenuity as the result of that freakish turn of the river Rhone. An American tourist visited the Perte du Rhone. He, perhaps, Yankee-like, shrugged his shoulders at first, as he thought of and compared the scene before him with his own glorious Niagara, but when his quick wit ripened into practical ideas, he began to solve a mighty problem. Thoughtfully he walked back to Bellegarde, and, going straight to the notary, said to him:

"Sir, your locality pleases me. Is any of the land for sale? I am possessed with the idea of building a sort of laundry establishment on these beautiful shores. Find me one or more choice spots, and I will purchase. Do you understand?"

"Perfectly," replied the notary.

And the American departed, promising to return in a week's time.

Sure enough, a week later the Yankee entered the notary's office again, and asked whether his application had brought favorable replies.

"Yes," said the notary, smilingly, and laying his hand on a large pile of letters, "you have only to make your selection of sites, for here is all the land of the vicinity placed at your disposal, almost at your own price, for the people about here are only too glad to sell, and, as you see, have eagerly grasped this, the first and only opportunity they have had to do so. I tell you frankly these facts, that you may feel tempted to make a larger purchase than I imagined you thought of doing when you first spoke of the matter to me." The American listened quietly, looked over the papers, learned the various prices, and ended by contracting to buy *all* the land offered for sale. The notary, as well as the inhabitants, was almost stupefied with astonishment. Some went so far as to say the stranger was mad, but when they found that his word and his bond were equally good, they were too glad of the results to question the motive. Thus an American became the proprietor of almost the whole plain of Bellegarde. Soon he began to show these unenlightened people why he had appeared "so mad" to them. He demonstrated that between that point where the Rhone disappears and where it returns again there is a considerable difference of level, and that just there was an enormous loss of water-power—a power which it was possible to gather up and utilize, and, in order to accomplish this, he proposed to open a new channel for the Rhone, and conduct it to the place where he wished to transform its fall into motive power. The idea was practicable, and was put into execution without much delay. A company has been formed, a subterranean channel of more than 500 yards in length has been dug, and a part of those waters which had been engulfed without profit to anybody, now follow peacefully their new road, to pour themselves into enormous turbines, and communicate to them a power valued at that of 10,000 horse-power. Ten thousand horses, however, at the bottom of a hole would, even with all their strength, be useless power without the ingenuity of man. And the question now was, how to transport said power to the summit of the steep banks of the Rhone, and distribute it over all the extent of the plain of Bellegarde. This was accomplished by means of iron wire cables, which transmitted movement and force to great pulleys, around which they were rolled. Power can thus be sent several miles as easily as water or gas is sent through a pipe or conduit, and the "Yankee from America" carried out his plans through this means. Now the lands are to be resold, the 10,000 horse-power will be rented, the American will realize a fortune, and Bellegarde will become the asylum of exiled workmen of Alsace, and the place where they will invest their little capital. So much for one American abroad! — *Galignani's Messenger.*

A BUILDER'S RIGHT TO THE CUSTODY OF PLANS.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — Allow me to ask your opinion in the following case:

Architect invites a party of builders to figure on certain building. Estimate is given and accepted, and contract is signed. After this the owner takes the possession of plans and specifications, saying it was the contract with the architect for him to hold the same. Architect remains, though, to superintend the building.

The builders are *not provided* with copies of either plans or specifications, and if they want information about anything they are to go to the owner and beg him to let them see this or that. They do it for a while, but finally get tired of such an unusual way of doing business, and seeing that some meddling had been done with the plans without their knowledge they informed the architect and the owner that they must be supplied with copy of plans and specifications, otherwise they will pay no attention to them. Their wish is not complied with: the owner still possesses the specifications and plans, and if he goes off he carries them with him.

Could the builders in this case be liable or responsible for any mistakes or omissions that might have been made through improper orders or information to their men? Supposing the owner or architect should call their attention to it after everything is done, are the builders to take it down and do it over again?

For an early answer begs your constant reader, BUILDER.

[This seems to us quite an unprecedented case. Why an owner should refuse to allow his contractor to have a copy of the contract drawings and specifications we cannot imagine, but we are clearly of opinion that unless the contract expressly provides otherwise, the builder is by universal custom entitled to the use of a full set of such copies. Whether, if he is deprived of them, he can be compelled to take down and rebuild any work which may not have been done in accordance with the drawings which were inaccessible to him, is a question so doubtful that we should advise him not to run the risk of raising it. If his contract is to build a certain structure in accordance with certain drawings and specifications, and he is ready and willing to perform his contract, but is prevented from doing so by being denied the usual and necessary copies of the drawings, his position is plain, and he can, we think, whether he completes the work or not, collect the whole contract price for what he would have done if he had not been prevented by the other party. If he undertakes to build from recollection he is likely to put himself in the wrong since the owner, although he is bound to allow the builder to carry out his contract, or if he prevents him, to pay him just as if he had completed it, is under no obligation to pay for anything which is not in the contract, or which he did not order, no matter how good the intentions of the builder may have been in doing it. — EDS. AMERICAN ARCHITECT.]

STRAW LUMBER.

FORT WORTH, TEXAS, August 14, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Please let me know where I could get information and what kind of machinery there is necessary for manufacturing straw lumber. Is there a patent? and how to obtain State rights.

A. MONCHEIN, Architect.

[We have never been able to learn the exact address of the parties engaged in the manufacture of straw lumber in this country, but we have seen it stated that one factory was in a Texas town. The most definite information we have ever come across is that contained in the English legation report published in our issue for August 5, and we have seen more frequent mention of this curious industry in English journals than in our own. — EDS. AMERICAN ARCHITECT.]

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TO EBONIZE SOFT WOODS.

Kansas City.

To the Editors of the American Architect: —

Will you be good enough to request, in the next number of your valuable paper, the contribution of recipes "with instruction" for ebonizing pine (soft).

My husband is a subscriber, and we appreciate your paper very highly. Very respectfully,

Mrs. J. H.

[A simple way of ebonizing soft wood is to rub in very finely pulverized charcoal with oil. To get an even tone by this means requires a practised hand. The common ebony stain is produced by applying to the wood a warm strong decoction of logwood, to every quart of which one drachm of alum has been added. After the wood has thoroughly dried brush it over with a solution of iron-filings in vinegar as often as required, letting the wood dry after each application. — Eds. American Architect.]

BRICK *vs.* IRON PRISON CELLS.

St. Paul, Minn., August 25, 1882.

To the Editors of the American Architect: —

Dear Sirs, — What is the difference between iron and brick used as cells, both properly ventilated and set in the centre of a building, and neither touching outside walls. Is there any difference as regards health? If so is it in favor of iron or brick?

If you will answer these questions in your journal you will much oblige A Subscriber.

[Iron cells need thorough ventilation to prevent condensation and make up for the loss of the transpiration of air which takes place very freely through brickwork. With this precaution there would probably be no material difference in healthfulness between the two kinds of cells. Of course the wrought-iron ones, if their expense can be afforded, are far more secure than those of brickwork, which is easily destroyed. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Saratoga Monument. — The monument is now forty-five feet high and much carved work is ready to be put in place.

A Monument to Rinehart, the Sculptor. — A monument over the grave of Rinehart, the sculptor, at Greenmount Cemetery, Baltimore, was unveiled July 17, in the presence of a number of the relatives and friends of the sculptor. The monument is a granite block surmounted by a bronze statue of "Endymion," one of the best works of Rinehart, and has been erected by Mr. William T. Walters, Esq., of Baltimore.

A Novel and Valuable Clock. — Within a short time the American Watch Company of Waltham, Mass., has completed and forwarded to the headquarters of the United States Signal Service Bureau at Washington a large, novel and very finely-constructed clock for the use of the service. The case is made of brass, of sufficient height to allow the swing of a pendulum one metre in length. The case is made perfectly air-tight and has been constructed in such a manner that the air can be exhausted and the movement run in a vacuum, thus avoiding the variations incident to atmospheric changes. A very ingenious electrical attachment has been affixed to the movement whereby the clock is wound as it runs, thus overcoming the variations usual when the main-spring is fully wound or partly spent. The manner in which this is accomplished is by alternately breaking and closing an electric circuit and using the motion thus obtained and the power of the electrical current in re-winding the spring by means of a worm and other mechanism, which is so graduated as to motion that the winding keeps exact pace with the running. The slightest variation from this is shown on a delicate indicator. The train is jeweled, and will consequently be but very little affected by the friction incident to such a complicated piece of machinery. Another of these clocks is in process of construction, and is intended for use at Wesleyan University, Middletown, Ct.

An Ingenious Storage Battery. — In December, 1881, Henry Sutton announced to the Royal Society of England that he had devised a storage battery, which consisted of a long strip of lead and another similar strip of sheet-copper, separated by a layer of sheet-rubber, and wound together into a roll. This roll was placed in a glass jar four inches deep and four inches in diameter, and filled with a solution of sulphate of copper — common blue vitriol. The sheets of lead, copper and rubber were perforated to allow the free circulation of the liquid, and all crystals of the blue vitriol excluded from the solution. The copper being made the positive electrode, the solution, which is highly blue, loses its color. When the cell is fully charged the solution is colorless. During the discharge of the storage battery the solution assumes its original azure hue. This change of color forms a beautiful means of telling when the cell is discharged it is a veritable charging gauge. The power of the battery is very great and very constant. It can be made to last for hours, time being dependent upon the quantity of sulphate of copper decomposed. This form of battery was in turn improved upon by Charles E. Buell of this city, who employed common lead shot, coated with mercury, and placed in a porous cup. He put this cup in a glass cell and surrounded it with a coil of copper wire cloth which served as the positive electrode. The employment of shot and wire cloth furnished the greatest surface in a given weight and constitutes a form most easily made. Mr. Buell verifies the published statement of Mr. Sutton that a cell four inches high and four inches in diameter will keep a No. 28 iron wire at red heat for two hours; that it is more constant, and does not polarize during discharge, as does the Faure battery. It weighs very much less, occupies less space and costs less than the Faure battery of like force, and is untrammelled by patent rights. — *New Haven Register.*

Hart's Statue of Henry Clay. — Hart's statue of Henry Clay, one of the pieces of statuary of which Richmond is most proud, has lately been treated to a thorough scouring and restoration. New hands have replaced the broken ones, and, instead of standing in the little pagoda on the green, the statue now occupies one of the niches in the quadrangular hall of the Capitol. The famous statue of Washington by Houdon occupies the centre of the circle, and another niche contains the bust of Lafayette.

The Excavations at Hissarlik. — The excavations undertaken by Dr. Schliemann at Hissarlik having come to a close, Hamdi Bey, Director of the Imperial Museum at Constantinople, has gone to the Dardanelles with several other antiquarians, for the purpose of receiving the share of the discovered treasures which, by the terms of the firman, belongs to the Imperial Government.

Sanitary Appliances in Paris. — As now provided for, Paris claims to have the benefit of the best devised system of sanitary appliances to be found in any city in Europe. The scavenging plant, under this new arrangement, is kept in a central depot, where materials of every description are stored and classified, for ordinary and extraordinary service. Among these sanitary supplies are chloride of lime, sulphate of zinc, sulphate of iron and carbolic acid as disinfectants, and hydrochloric acid and nitro-benzole as cleansing agents. Chloride of lime is used of a strength of one hundred to one hundred and five degrees; sulphate of zinc at a strength of one-eighth; and carbolic acid is used at a strength of one to forty, and down to one per cent, or even less. For watering streets and gutters it is used as weak as one of acid to one thousand of water. Hydrochloric acid is applied to urinals and slaughter-houses at a strength of one-sixth to one-tenth. Nitro-benzole is also employed of the same strength.

The Earth's Heat. — Scientific men in Japan are now discussing the possibility of utilizing the internal heat of the earth. At a recent meeting of the Seismological Society, John Milne read a paper, in which he said that the fact that there was an unlimited supply of energy in the interior of the earth had been generally overlooked, although portions of it crop out in countries like Japan, Iceland, and New Zealand, in the form of hot springs, solfataras, volcanoes, etc. He stated that there is an unlimited supply of water in hot springs within a radius of one hundred miles around Tokio, and that the heat of these springs could be converted into an electric current, and transmitted to the town. Mr. Milne was on the Comstock about a week ago, on his way home to England on leave of absence. He was much interested in the heat of the lower levels, which he went there to study. He is also a good deal interested in earthquakes, and in Japan has been conducting a series of experiments upon the vibrations of the earth at the time of earthquake shocks, and also the vibrations of artificial shocks produced by the explosion of heavy charges of dynamite. The delicate instruments used gave the same results in both cases. — *Boston Herald.*

Late Discoveries in the Troad. — Mrs. Schliemann has addressed to an Athens newspaper a letter in Greek, in which she says that close to the spot which she and her husband believe to be the site of ancient Troy have been found the remains of two buildings that are believed to represent temples Their appearance is so strange, however, that they cannot be said to resemble any of the well-known ancient temples, with the exception of that of Hera at Olympia, which, according to Pausanias, was erected probably about 1100 B. C. The first of them is 30 metres in length and 13 in width, while the walls are 1 4 metres in thickness. The other is 20 metres long and 7 metres broad, the walls being 1.2 metres thick. Owing to the great size of the first temple, Mrs. Schliemann thinks it scarcely credible that the roof could be solid and without supports; of the latter, at any rate, there is nothing now to be found. Throughout the entire "Illiad" of Homer, she says, there is no mention of such supports, while in the "Odyssey," where they are spoken of, they are described as of wood. Assuming that there had been wooden supports in the first temple, they could not, she argues, have stood on a floor of clay, and there must therefore have been a stone foundation beneath them, yet nothing of the kind is now to be discovered on the spot. — *Chicago Tribune.*

Experiments on Radiant Heat. — Professor S. P. Langley, of the Alleghany Observatory, finds as one of the results of the Mount Whitney experiments that the true solar constant or amount of heat sent to the earth, is one-half greater than that determined by Pouillet and by Herschel near the sea-level, and even greater than the recent values assigned by M. Violle. On the other hand, the temperature of space, so-called, is lower than that assigned by Pouillet. If the atmosphere of the earth were withdrawn the temperature of the latter would greatly fall, even though the sun's radiant heat were materially greater than it is. Mr. Langley believes that this temperature under such circumstances would be 50 degrees F.: that is, that mercury would remain a solid under the vertical rays of a tropical sun if radiation into space were wholly unchecked, or even if the atmosphere existing, it let radiations of all wave-lengths pass out as easily as they come in. It is not merely by the absorption of the air, but by the selective quality of this absorption, that the actual surface temperature of the earth is maintained. Without this comparatively little-known function, it appears doubtful whether, even though the air supported respiration and combustion as now, life could be maintained upon this planet. Accepting these results as true, the temperature of a planet may, and not improbably does, depend far less upon its neighborhood to, or remoteness from, the sun, than upon the constitution of its gaseous envelope, and indeed it is hardly too much to say that we might approximately indicate already the constitution of an atmosphere which could make Mercury a colder planet than the Earth, or Neptune as warm and habitable a one. — *New York Tribune.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

262,929. WINDOW-BLIND. — Jas. B. Childs, Rock Falls, Ill.

262,934. APPARATUS FOR PREVENTING THE ESCAPE OF SEWER-GAS INTO HOUSES. — Mathew F. Degan, Chicago, Ill.

262,937. FASTENER FOR MEETING-RAILS OF SASHES. — Gilbert J. Dickson, Albany, N. Y.

262,965. VAULT-LIGHT. — Jacob Mark, New York, N. Y.

262,967. MACHINE FOR DRESSING STONE. — Alexander McDonald, Cambridge, Mass.

262,972. COMBINED FIRE-EXTINGUISHER AND FIRE-ESCAPE. — Albert L. Murphy, Philadelphia, Pa.

262,978. DOOR-CHECK. — William F. Osborn, Burlington, Kan.

263,002. PIPE-SUPPORT FOR FLUES, CHIMNEYS, ETC. — Nathan U. Walker, Walker's, O.

263,043. FIRE-EXTINGUISHER. — Charles T. Holloway, Baltimore, Md.

263,046. EAVES-TROUGH. — George Huth, Delta, O.

263,070. SASH-FASTENER. — William E. Sparks, New Britain, Conn.

263,080. FIRE-EXTINGUISHING DEVICE. — Miciah Walker, Port Huron, Mich.

263,082. FASTENER FOR THE MEETING-RAILS OF SASHES. — C. Wolcott, Hartford, Conn.

263,091. COCK OR VALVE. — David R. Ashton, Clapton, County of Middlesex, and Jas. N. Sperryn, Brixton Hill, County of Surrey, England.

263,100. FIRE-ESCAPE. — Winfield S. Beebe, Middletown, Conn.

263,127. AUTOMATIC HEAT-REGULATOR AND ALARM. — John M. Dolen, Wiconisco, Pa.

263,156. BRICK-PRESS. — Edward Fales, Keokuk, Iowa.

263,180. COMBINED TRAP AND OVERFLOW. — Edwin A. Jackson, New York, N. Y.

263,181. FIRE-ESCAPE. — David Jenkins, Pittsburg, Pa.

263,235. CHIMNEY-TOP. — Porter B. Speer, Muscatine, Iowa.

263,244. PLATE-KEY FOR LOCKS. — Warren H. Taylor, Stamford, Conn.

263,251. WATER-CLOSET VALVE. — Henry A. Tobey, Dayton, O.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—Since our last report seventeen permits have been granted, of which the following are the more important:—

Grillett & Mann, four-st'y brick warehouse, Philpot St., w of Thames St.

John Weigman, two-st'y brick building, in rear of Pratt St., bet. Broadway and Register Sts.

Fred. Niemeyer, three-st'y brick building, King St., bet. Fremont and Pine Sts.

H. Seim & Co., two-st'y brick building, n w cor. Ostend and Leadenhall Sts.

F. H. Smith, two-st'y brick building, Monument St., bet. Sterling and Aisquith Sts.

Estate of Jno. Connolly, three-st'y brick building, n e cor. Patapsco and Boston Sts.

Michael J. Faust, two-st'y brick stable, in rear of Somerset St., bet. Biddle and Chase Sts.

Mrs. M. J. Seltzer, three-st'y brick building, Chester St., bet. Fayette St. and Fairmount Ave.

Henry Pierson, three-st'y brick building, Sharp St., bet. Cross and Hamburg Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Emerald St., No.* 59, Ward 16, for C. W. Tuxbury, Trustee for Ralph Huntington heirs, family hotel, 45' x 52' 4", four-st'y; Stephen Moxon, builder.

Emerald St., No. 60, Ward 16, for C. W. Tuxbury, Trustee for Ralph Huntington heirs, family hotel 45' x 52' 4", four-st'y; Stephen Moxon, builder.

Emerald St., No. 61, Ward 16, for C. W. Tuxbury, Trustee for Ralph Huntington heirs, family hotel, 45' x 52' 4", four-st'y; Stephen Moxon, builder.

Emerald St., No. 62, Ward 16, for C. W. Tuxbury, Trustee for Ralph Huntington heirs, family hotel, 45' x 52' 4", four-st'y; Stephen Moxon, builder.

Hanover St., Nos. 174–176, Ward 6, for James Blackie, dwell. and store, 19' 4" x 58' 6", four-st'y; Richardson & Young, builders.

Wood.—N St., cor. Eighth St., Ward 14, for William Gardner, dwell. and store, 22' x 40' and 46' 10", two-st'y; L. D. Robinson, builder.

Clarence St., near Dudley St., Ward 20, for Harrison B. Tebbets, dwell., 21' and 26' x 42", three-st'y; John O. Keefe, builder.

Brooklyn.

BUILDING PERMITS. — *Harrison Ave.*, e s, 20' s Lynch St., 3 three-st'y frame tenements; cost, each, $4,500; owner, J. Bossert, 18 Johnson Ave.; architect, J. Platte; builders, J. Auer and L. Bossert.

Pulaski St., No. 112, s s, three-st'y brownstone dwell.; cost, $7,000; owner, N. Poulson, 108 Pulaski St.; architect, F. A. Winslow; builder, J. H. Smith.

Lincoln Pl., s s, 149' e Seventh Ave., 3 four-st'y brownstone dwells.; cost, each, $12,000; owner, architect and builder, Wm. Flanagan, 46 Berkeley Pl.

St. John's Pl., s s, 277 e Seventh Ave., 5 four-st'y brownstone dwells.; cost, each, $12,000; owner, architect and builder, Wm. Flanagan, 46 Berkeley Pl.

Oakland St., e s, about 204' n Van Cott Ave., three-st'y frame tenement; cost, $4,500; owner, J. H. W. Viemeister, 442 Manhattan Ave.; architect and carpenter, A. Lange; mason, M. Vogel.

Oakland St., s e cor. Freeman St., three-st'y frame tenement; cost, $3,000; owner, John Dugdale, Darien, Conn.; architect and carpenter, J. J. Randall; masons, McHugh Bros.

Clifton Pl., n s, 116' 8" e Nostrand Ave., 2 two-st'y front, three-st'y rear, brownstone dwells.; cost, each, $4,000; owner, Abel Miller, 373 Decatur St.; architect, S. T. Miller; builder, T. Miller.

Clinton Ave., w s, 142' 6" s Greene Ave., three-st'y brick and terra-cotta dwell.; cost, $25,000; owner, C. N. Hoagland, on premises; architects, Parfitt Bros.; builders, T. B. Rutan and Morris & Selover.

Penn St., s s, about 100' e Lee Ave., three-st'y brick dwell., cost, $10,000; owner, Henry Rankin, Bedford Ave.; architect, E. F. Gaylor; builder, C. L. Johnson.

Prospect St., n s, 50' w Evergreen Ave., one-st'y brick boiler-house and chimney; cost, $3,500; owner, S. Liebmann's Sons, Forrest St., cor. Bremen; architect, Th. Engelhardt; builder, H. W. Adams.

Eckford St., Nos. 162 *and* 164, e s, 225' n Nassau Ave., 2 three-st'y frame tenements; cost, each, $4,400; owner, Otto J. Steffelin; architect, Fred Webber; builders, I. & J. Van Riper and S. M. Randall.

Adams St., No. 99, n s, 33' 10" w Evergreen Ave., three-st'y frame tenement; cost, $5,000; owner, Geo. Reinhardt, 97 Adams St.; architect, Th. Engelhardt; builder, M. Metzen.

ALTERATIONS. — *Myrtle Ave., No.* 531, raised 7' and frame st'y beneath; also three-st'y frame extensions; owner and architect, Ann Flood, on premises; builders, C. Collins and J. Flood.

Franklin Ave., s e cor. Atlantic Ave., one-st'y addition; total cost, $5,200; owner, John J. Drake; builder, P. Sullivan.

Chicago.

TOWN.—Designs are being prepared for shops and a town, comprising 1,000 houses, churches, schools, library, theatre, etc., on a similar plan to Pullman City, for the United States Rolling Stock Co., near Chicago; Messrs. Wilson Bros. & Co., of N. Y., are the architects.

CHURCHES.—Work has been resumed on the nave of Ascension Church, on La Salle Ave. The sum of $10,000 will be expended this season.

The Western Ave. Congregational Chapel Society is building, at the cor. of Polk St. and Western Ave., a brick church, 40' x 90', and a chapel, 30' x 40'; cost, $10,000.

Jas. R. Willett has completed arrangements for the erection of the St. Malachi Church, on the cor. of Western Ave. and Walnut Sts.; cost, $20,000.

The corner-stone of St. Thomas's Episcopal church, on Dearborn St., near Thirtieth St., was laid August 19.

The architect of the new church to be built on Milliard Ave. is C. P Randall; cost, $5,000.

HOSPITAL. — The plans for the new Cook County hospital-building are advancing slowly in Mr. J. C. Cochran's office.

HOUSES. — Theo. Karls has let contracts for a house for C. Kaler, on West Madison St., with stores underneath; cost, $10,000; also a store and dwell. on South Park Ave., for W. L. Sullivan, to cost $9,000.

SEMINARY. — W. L. B. Jenny is making plans for additions and alterations to the Theological Seminary of the North-west (Presbyterian), cor. of Halsted St. and Belden Ave. Among other things is a new residence for the professors, which will in itself cost $50,000.

OFFICE-BUILDING. — F. L. Charnley has let the contracts for the Averell Building, which is to be built on the cor. of Jackson St. and Wabash Ave. It is to be six-st'y, with a basement; cost, in the neighborhood of $60,000. The foundations are being laid.

ELEVATORS. — J. A. McLennan, architect, is to build elevators at Toledo, Cincinnati and Detroit.

STORES. — The Watson Building, cor. of La Salle, Kinzie and North River Sts., E. L. Bauman, architect, will cost about $80,000.

W. Strippleman has let the contracts for the Slaughter-building on Wabash Ave., near Congress St.; it is to be six-st'y; cost, $60,000.

Mr. Strippleman is also building a store and flats, cor. of Wentworth Ave. and Twenty-sixth St., for J. Oppenheimer; cost, $17,000. Also a store and flats for C. L. Kramer, cor. Madison St. and Campbell Ave.; cost, $14,000. Also, 6 dwells., on Campbell Ave., for Eich Bros.; cost, $21,000.

DEPOT. — The Illinois Central Railroad will at once begin the erection of a depot where the ruins of the former depot, burned in the great fire of October 9, 1871, still stand. It will cost over $500,000, and will be completed in 1883. It will be jointly occupied by the Illinois Central, the Michigan Central, the Baltimore & Ohio, and the New York, Chicago and St. Louis Railroads.

BUILDING PERMITS. — Charles Hagenon, two-st'y and basement brick dwell., 44' x 58', 44 and 46 Fowler St.; cost, $6,000.

A. L. Amberg, two-st'y brick dwell., 22' x 56', McAllester St., near Sibley St.; cost, $4,000.

Martha Mathews, two-st'y brick dwell., 21' x 32', 194 Ashley St.; cost, $2,500.

Agricultural Insurance Co., two-st'y brick addition, 25' x 55', 638 West Madison St.; cost, $6,000.

Henry Kreite, two-st'y brick dwell., 21' x 46', 548 North Market St.; cost, $3,000.

G. W. Henry, two-st'y and basement brick dwell., 25' x 65', 2805 Prairie Ave.; cost, $20,000.

Barbara Titus, 5 two-st'y brick dwells., 19' x 28' each, Van Buren St., near Loomis St.; cost, $5,000.

S. Burdo, three-st'y and basement brick dwell. and store, 21' x 53', 229 Larrabee St.; cost, $6,000.

Mrs. A. Jertram, one and three st'y brick store and dwell., 24' x 60', No. 590 Ashland Ave.; cost, $5,600.

J. R. Jones, one-st'y and mansard brick barn, 23' 6" x 56', 2704 Michigan Ave.; cost, $3,000.

Cincinnati.

BUILDING RECORD. — The assessors of Hamilton County report the following number and cost of new houses erected for the year ending April 12, 1882: —

808 dwells.; cost, $1,446,020.
48 factories; cost, $284,540.
3 hotels; cost, $88,500.
Machine-shop; cost, $6,660.
Flouring-mill; cost, $1,000.
2 saw-mills; cost, $2,500.
5 railroad depots; cost, $27,850.
74 stables and barns; cost, $27,300.
42 stores and warehouses; cost, $156,280.
20 miscellaneous; cost, $41,910.
Total, 1,004; cost, $2,082,560.

The above may be taken correct as to numbers, but about one-half as to cost.

FIRE RECORD.—The records of the Fire Department show that the following buildings were destroyed by fire or otherwise during the year ending June 30, 1882:—

100 buildings destroyed by fire; cost, $771,780.
57 buildings destroyed by other causes; cost, $58,580; other property destroyed by fire or flood; cost, $230,000.
Total, 157; cost, $1,060,360.

This shows that the amount destroyed was fully one-half the cost of all the new buildings erected during the same period.

BUILDING PERMITS. — Brooks, Waterfield & Co., six-st'y brick tobacco warehouse, Front St., bet. Vine and Race Sts.; Charles Crapsey, architect; cost, $50,000.

J. Lippert, four-st'y brick dwell., cor. of Thirteenth and Jackson Sts.; cost, $6,000.

Wm. Bicksmeyer, two-st'y brick dwell., Wade St., near Demman Ave.; cost, $2,500.

N. Wolff, store on Pearl St., bet. Pike and Lawrence Sts.; cost, $10,000.

9 permits for repairs; cost, $3,000.

New York.

BUILDING PERMITS. — *Fifty-fourth St.*, n s, 135' w Sixth Ave., four-st'y brick and stone dwell.; cost, $11,000; owners, Wm. H. L. Lee, et al, 20 Nassau St.; architect, A. Crooks; builders, Liszt & Lennon and James Thompson.

Fifty-sixth St., s s, 125' w Ninth Ave., five-st'y brownstone tenements; cost, about $16,000; owner, Abraham Benson, 30 North Moore St.; architects, Blau & Quaife.

West Forty-sixth St., No. 517, five-st'y brick tenement; cost, $14,000; owner, John Totten, 517 West Forty-sixth St.; architect, C. F. Ridder, Jr.

Seventh Ave., n w cor. Fifty-fourth St., five-st'y brick tenement; cost, $30,000; owner, Thomas N. Lawrence, Coleman House; architect, Jas. Stroud; builders, Wm. Pettit and J. Washburn.

West Fifty-eighth St., No. 225, between Seventh Ave. and Broadway, four-st'y brick stable, brownstone trimmings; cost, about $15,000; owner, T. H. McGrau, Poughkeepsie; architect, L. H. Broome.

Second Ave., e s, 70' s Seventy-second St., five-st'y brick tenement; cost, $28,000; owner, N. A. McBride, 436 West Fifty-eighth St.; architect, P. C. Cowen; builder, R. Shaw.

Second Ave., Nos. 787, 789 *and* 791, 3 five-st'y brick tenements; cost, each, $12,000; owner, Edward Mulvaney, 170 East Seventieth St.; architect, Jno. Sexton; builder, C. Callahan.

One Hundred and Twenty-sixth St., n s, 425' e Eighth Ave., 3 four-st'y brownstone tenements; cost, each, $17,000; owner, Franklin A. Thurston, 62 East One Hundred and Thirty-third St.; architect, G. Robinson, Jr.

Baxter St., s w cor. Walker St., 2 three-st'y brick stores and dwells.; cost, each, $4,000; owner, Jacob Cohen, on premises; architect, J. Brandt.

West Thirty-sixth St., No. 446, s s, 200' e Tenth Ave., five-st'y brick and stone tenement; cost, $12,000; owner, Henrietta Holsderber, 313 West Twenty-eighth St.; architect, Wm. Kusche.

One Hundred and Twenty-seventh St., 250' e Seventh Ave., four-st'y basement brick flat; cost, $40,000; owner and builder, John B. Davis, 236 East One Hundred and Twenty-sixth St.; architect, Wm. H. Hume.

Jay St., No. 14, eight-st'y brick warehouse; cost, $37,000; owners, D. Buchner & Co., 173 Duane St.; architects, Berger & Baylies; builders, John P. Schweikert and John Downey.

Chatham St., No. 159, rear; three-st'y brick stable and workrooms; cost, $3,500; owner, B. M. Cowperthwait, 157 Chatham St.; architect, H. B. Thompson; builders, Jno. Thatcher and G. B. Colyer.

Avenue A, s e cor. Fifty-seventh St., four-st'y brick and brown stone flats; cost, $20,000; owner, Thos. Fitzgerald, Fifty-sixth St. and Avenue A; architect, W. R. Smith.

Alexander Ave., w s, One Hundred and Thirty-sixth St. to One Hundred and Thirty-seventh St., 12 three-st'y brick dwells.; cost, each, $7,500; owner, Mary Dugan, 144 Alexander Ave.; architect, John Rogers; builder, Jas. O'Kane.

Park Ave., e s, Sixty-ninth and Seventieth Sts., 12 three-st'y and attic brick (brownstone front) dwells.; cost, total, $300,000; owner and builder, Wm. H. Browning, 441 East Seventy-seventh St.; architect, Bassett Jones.

Fifty-fifth St., n s, 100' w Sixth Ave., 6 four-st'y and basement brick and stone dwells.; cost, total, $90,000; owner, A. H. Barney, 82 Broadway; architect, James B. Lord; builders, L. N. Crow and Hamilton & Henry.

One Hundred and Forty-fifth St., s s, 125' e Brook Ave., three-st'y frame dwell.; cost, $3,300; owner, P. Stapleton, 417 West Fifty-sixth St.; architect, James T. McKinstry; builder, Ed. McKinstry.

ALTERATIONS.—*West Thirty-first St., No.* 147, two-st'y brick extension; cost, $3,000; owner, John Wagner, on premises; architect, J. Kastner.

Cherry St., No. 376, n e cor. Gouverneur St., raised one and one-half stories, also, two-st'y brick extension, interior remodelled and walls altered for store and tenement; cost, $9,500; owner, P. A. Fogarty, 352 West Fourteenth St.; architect, J. B. Franklin.

Cherry St., No. 196, cor. Manhattan Lane, rebuild part destroyed by fire; cost, $3,600; owner, Robert

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Spier, exr., 162 Montague St., Brooklyn; architect and carpenter, J. Rea; mason, A. S. Knowlton.

Division St., No. 260, take off peak and replace by flat roof, area walls, etc.; cost, $3,000; owner, Daniel Murphy, on premises; builder, Thos. Green.

West Twenty-fourth St., No. 152, two-st'y brick extension; cost, $5,000; owner, Chas. Delmonico, Fifth Ave. and Twenty-sixth St.; architects and builders, Jas. B. Smith & Prodgers.

The "Alcazar," cor. of Forty-first St. and Broadway, is to be altered, and among the improvements will be the introduction of proscenium boxes; Mr. G. E. Harding, architect.

The Bijou Theatre is also to be improved; from designs of Mr. Horace Townsend.

Philadelphia.

Building Permits.—*Front St. and Lehigh Ave.*, n w cor., three-st'y factory, 40' x 107'; A. B. Rorke, contractor.

Mercy St., s s, w of Fifth St., 9 two-st'y dwells., 14' x 28'; Clayton Allen, owner.

Susquehanna Ave. and Delhi St., 6 two-st'y and three-st'y dwells., 14' x 28' and 13' x 26'; Campbell & Atkinson, owners.

Sixty-four-and-one-half St., e s, s of Hamilton St., 2 two-st'y dwells., 16' x 44'; Harry Pettit, contractor.

Chestnut St., No. 1029, two-st'y store, 24' x 60'; Henry Phillipi, contractor.

Gordon St., s s, e of Sepviva St., three-st'y dwell., 15' x 18'; Alex. Mellor, contractor.

Arch St., No. 927, three-st'y addition to store, 24' x 30'; H. W. Vankirk, contractor.

Wyoming St., e s, s of Clearfield St., 4 two-st'y dwells., 15' x 42'; W. H. Reeves, owner.

Swayne St., No. 1609, three-st'y dwell., 18' x 44'; J. F. Winner, owner.

Shackamaxon St., n s, w of Girard Ave., three-st'y dwell., 19' x 28'; J. M. Buchanan, contractor.

Howard St., e s, s of Lehigh Ave., two-st'y factory, 42' x 110'; Thos. Taylor.

Washington Lane and Sprague St., s e cor., three-st'y dwell., 40' x 50'; A. F. Cope, owner.

K St., w s, w of Kensington Ave., 2 two-st'y dwells., 14' x 40'; Jno. Rheim, owner.

Broad and Cumberland Sts., 2 three-st'y dwells., 18' x 53'; Thomas McCrackin, owner.

Hope St., e s, bet. Somerset and Cambria Sts., 4 two-st'y dwells., 17' x 30'; W. A. M. Fuller, owner.

Hope St., w s, n of Columbia Ave., two-st'y dwell. and one-st'y stable, 15' x 36' and 15' x 51'; Jas. Hood, contractor.

Pratt St., n s, w of James St., 4 two-st'y dwells., 14' x 44'; Jno. Brown, owner.

Ash St., w s, n of Thompson St., 2 two-st'y dwells., 16' x 28'; George F. Little, contractor.

St. Louis.

Building Permits.—Fifty-three permits have been issued since our last report, twenty-one of which are for unimportant frame houses. Of the rest those worth $2,500 and over are as follows:

Chris. Hesemann, dwell.; cost $3,000; R. Bisser, contractor.

J. Larrimore, two-st'y dwell.; cost, $14,000; J. Mahon, contractor.

Mrs. Virginia I. Paul, two-st'y dwell.; cost, $5,000; J. A. Conlon, contractor.

M. Loewenstein, 2 three-st'y dwells,; cost, $12,000; A. Beinke, architect; Charles Wehking, contractor.

Erwin Spraul, two-st'y dwell.; cost, $7,000; E. Jungenfeld, architect; Charles Wehking, contractor.

H. Geiseking, two-st'y dwell.; cost, $3,200; Charles Wehking, contractor.

H. Stabenow, two-st'y dwell.; cost, $4,400; C. May, architect; Casper Bleikamp, contractor.

D. D. Feisher, two-st'y dwell.; cost, $5,500; J. Stewart, architect; E. F. Hoffmann, contractor.

J. Fimmermann, two-st'y dwell.; cost, $4,900; Klute & Hillebrand, contractors.

E. Mueller, two-st'y dwell.; cost, $3,000; W. C. Popp, contractor.

Philip Rothschild, two-st'y dwell.; cost, $2,800; A. M. McAllister, contractor.

Mrs. Helena Roeba, two-st'y dwell.; cost, $2,850; F. Mueller, contractor.

Thomas Gallagher, 2 two-st'y dwells.; cost, $9,000 each; T. Brady, architect.

R. H. Newburry & J. F. Whitney, two-st'y dwell.; cost, $3,000; R. H. Newburry, contractor.

George H. Tower, one-st'y factory; cost, $2,500; A. Cameron, architect.

General Notes.

Columbia, S. C.—Mr. J. G. Cutler, architect, of Rochester, is to build a house for Mrs. E. L. Morris; cost, $5,000.

Fond du Lac, Wis.—Work on the court-house has been stopped for a while, on account of the supply of bricks giving out.

Lancaster, Pa.—It has been decided to at once rebuild the main building of the insane asylum lately burned.

Peoria, Ill.—The excavation for the new mammoth elevator in the lower part of the town, has been completed.

Stony Island, Ill.—New car shops are to be built for the New York, Chicago & St. Louis Railroad.

Takis, Mo.—A two-st'y brick court-house for Atchison County is to be built, at a cost of $90,000.

Ulysses, Neb.—Residence for Arthur Hale, 32' x 36' 6"; Hazlehurst & Huckel, architects, Philadelphia, Pa.

Wayne Junction, Pa.—Messrs. McCallum, Crease & Sloan are about to erect the following manufacturing buildings: a three-st'y main building, 42' 2" x 112' 2"; weaving-shed, 83' x 218' 10"; dye-house, 42' x 131'; boiler and engine-house. 52' x 92'.

PROPOSALS.

STONE. [Near Louisa, Ky.]

U. S. Engineer Office, 82 West Third St., Cincinnati, O., August 9, 1882.

Sealed proposals, in duplicate, will be received at this office **until noon on the 25th day of September, 1882**, for furnishing stone for the construction of a lock in the Big Sandy River, near Louisa, Ky.

Approximate quantity of stone required 11,200 cubic yards. All stone to be delivered by September 1, 1883. Specifications and printed forms for proposals and hektograph copies of general plan will be furnished on application to the undersigned. Applications for blanks should be indorsed on the envelope "Official Business."

350 JAS. W. CUYLER, Maj. of Eng'rs, U. S. A.

HEATING AND VENTILATING APPARATUS. [At Cleveland, O.]

Office of Supervising Architect, Treasury Department, Washington, D. C., August 19, 1882.

Sealed proposals will be received at this office **until 12 M., on the 11th day of September, 1882**, for furnishing, delivering, and putting in place complete a low temperature, hot-water, heating and ventilating apparatus in the Post-office, etc., building at Cleveland, O. The apparatus to be constructed in accordance with drawings and specification. Copy of specification and any additional information may be had on application at this office or the office of the Superintendent, where the drawings may be seen.

JAMES G. HILL,
350 Supervising Architect.

TILE FLOORS AND MARBLE WORK. [At Des Moines, Ia.]

Office of the Board of Capitol Commissioners, Des Moines, Ia., August 24, 1882.

Sealed proposals will be received at this office **until 4 o'clock, P. M., of the 28th day of September, 1882**, for the encaustic and geometrical tile floors on the second and third stories, and the main corridor of the first story of the new Capitol at Des Moines, Iowa. Also for the marble work in the library, corridors in rear of and rooms connected with the House and Senate chambers, and for the marble stairway in the east wing, and the wainscoting in the offices on the first story in the west wing.

Specifications can be obtained by application to the Secretary, and plans can be examined at the office of the Commissioner.

By order of the Board of Commissioners.

351 ED. WRIGHT, Secretary.

SEWER. [At Columbus, O.]

Sealed proposals will be received at the Office of the City Clerk, in Columbus, O., **until Saturday, September 16, 1882, at 12 o'clock, noon**, for furnishing materials and doing the following work, to wit:—

For constructing a main trunk brick sewer, four feet inside diameter, in Fulton St., from the terminus of the main trunk sewer in said Fulton St., near Sixth St., to Parsons Avenue.

Plans, profiles, and specifications for said work can be seen at the office of the City Civil Engineer, after the first of September.

Each bid must contain the full names of all the parties interested in the same, and must be accompanied with good and sufficient security that, if the bid shall be accepted the contract will be entered into, and the work faithfully performed.

The City Council reserves the right to reject any or all bids at discretion. JOHN GRAHAM,
350 City Engineer.

SEWER. [At Columbus, O.]

Sealed proposals will be received at the Office of the City Clerk, in Columbus, O., **until Saturday, September 16, 1882, at 12 o'clock, noon**, for furnishing materials and doing the following work, to wit:—

For constructing a main trunk brick sewer, four feet inside diameter, in Mound St., from the terminus of the Mound St. main trunk sewer, at or near Washington Ave., to Luckhaup's Lane.

Plans, profiles and specifications for said work can be seen at the office of the City Civil Engineer, after the first of September.

Each bid must contain the full names of all the parties interested in the same, and must be accompanied with good and sufficient security that if the bid shall be accepted, the contract will be entered into, and the work faithfully performed.

The Council reserves the right to reject any or all bids at discretion. JOHN GRAHAM,
350 City Engineer.

LIFE-SAVING STATIONS. [North Carolina Coast.]

Office of General Superintendent, Treasury Department, U. S. Life-Saving Service, Washington, D.C., August 24, 1882.

Sealed proposals will be received at this office **until 12 o'clock, noon, of Thursday, the 14th day of September, 1882**, for the construction of three life-saving stations on the coast of North Carolina, one to be located near the south side of New Inlet, Dare County; one at Cape Hatteras, Dare County, and one on the west side of Hatteras Inlet, about three miles south of the Inlet, in Hyde County.

Bidders will state in their proposals the time within which they will agree to have the buildings completed ready for occupancy.

Each bid must be accompanied by a bond in the sum of five hundred dollars, with two good and sufficient sureties, conditioned that the bidder shall enter into contract without delay, and give such bonds as security for the faithful performance thereof as may be required if his bid be accepted; or by a deposit of five hundred dollars United States currency or bonds to be returned to the unsuccessful bidder after the award of the contract, and to the successful bidder after his contract and bond for the faithful performance of the terms thereof shall be approved by the Secretary of the Treasury.

Specifications and plans, forms of proposals, contract, and bond can be obtained at the offices of the Collectors of Customs at Wilmington, N. C.; New Berne, N. C.; Norfolk, Va.; of J. W. Etheridge, Superintendent Sixth Life-Saving District, Manteo, N. C.; of Captains John McGowan and J. H. Merryman, U. S. R. M.; Superintendents of Constructions of Life-Saving Stations, No. 3 Bowling Green, New York City, and also upon application to this office.

All proposals (which may be submitted for one or all of the stations) must be indorsed "Proposals for the construction of Life-Saving Stations on the coast of North Carolina," and addressed to the General Superintendent of the Life-Saving Service, Washington, D. C.

The right to reject any or all bids, or to waive defects, if deemed for the interest of the Government is reserved. S. I. KIMBALL,
350 General Superintendent.

LIMESTONE. [At Cincinnati, O.]

The Cincinnati Gas-Light and Coke Company will receive tenders **up to noon, Saturday, September 16, 1882**, for

Eight thousand perches of Blue Hill limestone, to be delivered at "East End Garden," First Ward, running from Front St. to Ohio River, between Main and Spencer Sts.

Five hundred perches of paving-stone, to be delivered between first of October and first of November.

Two thousand five hundred perches of building stone, to be delivered between first of November, 1882, and first of January, 1883.

Two thousand perches of building-stone, to be delivered between first of January and first of March, 1883.

Three thousand perches of building-stone, to be delivered between first of March and first of May, 1883.

Plans and specifications on file at the Gas Office. Company reserves privilege of rejecting any or all bids. 350

CUT GRANITE AND FLAGGING. [At Washington, D. C.]

Office of Building for State, War and Navy Departments, Washington, D. C., August 19, 1882.

Sealed proposals, for furnishing and delivering the cut granite required for the approaches of the north wing of the building for State, War and Navy Departments, in this city, will be received at this office, **until 12 M., on September 19th, 1882**, and opened immediately thereafter, in presence of bidders.

Sealed proposals will also be received separately for furnishing and delivering the blue and red flagging for the same approaches, to be opened at the same time and place.

Specifications, general instructions to bidders, and blank forms of proposals for either of the above materials will be furnished to established dealers, on application to this office.

THOS. LINCOLN CASEY,
350 Lt.-Col. Corps of Engineers.

SCHOOL-HOUSE. [At Dunkirk, O.]

Sealed proposals will be received at the office of the Board of Education **up to 12 M., August 31, 1882**, for furnishing materials and performing work in the erection of and completing a union school-building according to plans and specifications to be on file at said office on and after August 23, 1882.

Each proposal for the several parts of the work to be made separate, as follows:—

Excavation.
Brick, rubble and cut-stone work.
Carpenter and joiner work and iron-work.
Galvanized iron, slate and tin work.
Painting and glazing.
Plastering.

The contract to be let separate or under one contract, the Board reserving the right, also, to reject any or all bids.

The names of the sureties to accompany each bid, that a contract may be entered into in case said contract is let. For further information address JOSEPH H. SWORLIM, Clerk; or J. C. HOLLAND, Architect, Ada, Ohio. 349

SANATORIUM. [At Dansville, N. Y.]

Sealed proposals will be received by the undersigned **until Tuesday, the 5th of September, at noon**, for the erection and completion of a five-st'y fire-proof brick building, 272' in length and about 50' in width, for a sanatorium, on the site of the one recently destroyed by fire in Dansville, N. Y. Drawings and specifications can be seen and information had on application to the architects, Warner & Brockett, 62 Powers Block, Rochester, N. Y.

The right to reject any and all bids is reserved.

Acceptable bonds for the faithful performance of the contract will be required.

PROPRIETORS DANSVILLE SANATORIUM.

SCHOOL FURNITURE. [At Cincinnati, O.

Sealed proposals will be received by the Xenia City Board of Education **until September 12, 1882, at 1 o'clock, P. M.**, for furnishing furniture for the new school-house, as follows:—

Primary grade, 100 single desks.
Third and fourth year grade, 90 single desks.
Fifth year grade, 90 single desks.
Sixth year grade, 90 single desks.
Seventh and eighth year grades, 90 single desks.
High school, 100 single desks.
Recitation chairs, 90.
Teachers' desks, 12.
Principal's desk, 1.
Furniture for Superintendent's office.

The right to reject any or all bids is reserved.

A. M. STARK, President.
B. Schlesinger, Clerk. 349

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 350.

SEPTEMBER 9, 1882.

Entered at the Post-Office at Boston as second-class matter.

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AFTER two years of preparation the Edison Electric-Light Company has begun to deliver electricity for lighting purposes in its first New York district. Certain Wall-street offices were the first to be supplied, and the lighting proved completely successful. The common defect with incandescent lamps, — the flickering of the light — has been quite overcome, and the lamps now in operation in the district are all that could be desired. The flickering, where it exists, is due to slight changes in the intensity of the current, which may be caused by irregular action of the machinery for generating it, or any similar circumstance. Where dynamo-electric machines are driven by belts from a pulley, incandescent lamps supplied from them change at every passage of the rivets which join the ends of the belt over the driving pulley, and the monotonous regularity of the flickering so occasioned is very trying to a nervous person. To avoid this, each of the enormous dynamo-electric machines at the Edison station is driven by a special engine, whose piston-rod is connected directly to the shaft which carries the armatures of the dynamo machine, without the intervention of belts or gearing, and a steady motion is thus obtained. With other systems of incandescent lighting the secondary battery, which will probably be interposed between the generating machine and the lamps, will serve to regulate the transmission of the force, so that the electric-light of the future promises to be at least far pleasanter to the eyes than gas-light. According to the New York *Evening Post*, many of those persons in the first Edison district who have received their supply of electricity have already abandoned gas-light, and have notified the companies to remove their meters. This seems a little hasty, but we hope their confidence in the permanence of the electric supply will prove to be well founded.

WE wish we could say that the building committees of churches always showed that self-denying regard for other people's wishes which their members probably practise in private life. Just now a ridiculous and discreditable quarrel is in progress between Mr. Wakefield, of St. Johnsbury, Vermont, and the proprietors of a Presbyterian church, who, according to the newspaper accounts, bought a lot of land, with, as he says, the understanding that a passageway should be left between any building which might be erected on the lot, and his premises, which adjoin, but instead of this began to put in the foundation for a church within twenty inches of the boundary. Finding this out, Mr. Wakefield erected a fence on his land, thirty feet high, covered with barbed wire on the side next the new building. The church authorities attempted to board over the fence on their side, but were stopped by an injunction, commanding them to desist from touching or making any use of the fence. This unexpected difficulty necessitated the modification of the contract with the builders, who had not contemplated such proceedings in their estimate, and a new contract was made in accordance with the altered circumstances. At present, the construction is going on as rapidly as work can be pursued in a space twenty inches wide, lined on one side with bristling spikes, and the other inhabitants of the town look on, delighted at the sport. It is said that Mr. Wakefield desired to have the church set at a little distance from the line, in order that snow might not slide from the roof into his grounds. This he has an unquestionable right to require in any case. The fall of snow from the roof of the building upon his land, or even the turning of surface-water over his premises during rains by any change in the grading, constitute a trespass which he is in no way bound to suffer, and he can compel the church at any cost to prevent them.

EVERY two or three months we take occasion to say something about the remarkable success with which the manufacturers of sectional houses, if there are any such in this country, manage to conceal their addresses from those who would like to become their customers. The most frequently repeated of all the many questions which we receive — one which we have become weary of answering — is the inquiry where the sectional or portable buildings so largely sold abroad, and once manufactured here, are to be procured. Our correspondents alone, for the last four or five years, supposing them to order one house each, would have kept a considerable establishment fully occupied, and we hope that any persons undertaking such business, for their own benefit as well as ours, will keep us informed of their whereabouts.

THE stockholders of the Keely Motor Company have had a meeting in Philadelphia, which seems to have ended in a delightful reconciliation between them and their distinguished principal. The latter was voted an immediate present of one thousand dollars in cash, and fifteen hundred shares of the Company's stock, which he "consented to receive," and permitted it to be "understood" that upon the payment of this tribute he would "go ahead" with his mysterious operations. Whether the old machine, from "oxidation" or other causes, has become useless, we do not learn, but it appears that castings are to be made for a new one, of five hundred horse-power. We trust that the cost to the stockholders of the second apparatus will be less than that of the first, but that the great inventor will in any case find means for keeping up their spirits we can no longer doubt. Indeed, it is already reported that in a moment when the general joy had perhaps thrown him a little off his guard, he confided to a bystander the information that "he should soon be able to take a railway train from Chicago to New York at a cost for fuel of less than fifty cents." It will of course be necessary to construct a locomotive to carry into effect this important discovery, and perhaps a new company, with fresh stockholders, might with advantage be formed to supply funds for the purpose. However this may be, it certainly seems as if, what with general salary, extra payments for "going ahead," and special subsidies for the removal of "oxidation" from two or three machines, Mr. Keely's future prospects were more comfortable than ever.

THE competition for the San Francisco Garfield Monument has been decided in favor of Mr. F. Happersberger, a young gentleman who has studied at the Academy of Arts in Munich. The design is described as consisting of a pedestal raised on a base of gently ascending steps. At the foot of the pedestal is seated a bronze figure of America, leaning on a sword and weeping. The sides of the pedestal bear eagles, watching and guarding the emblems of war and commerce, and the national flag and shield. Surmounting all this is the statue of Garfield, in bronze, ten feet high. With excellent taste, the inscription is made to consist only of the lamented President's own expression, — "*Strangulatus pro Republicâ.* We hope to know more of the design hereafter, and are quite ready to believe that the artist has given an ample equivalent for the reward which he is to receive.

SIR EDWARD WATKIN, the enthusiastic chief of the Channel Tunnel Company, has shown an indiscreet zeal in pursuing his great project, which may lead him into trouble before long. Every one remembers that after the panic which seized the British public at the idea of opening a door to invasion, a Com-

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mittee of the Board of Trade was appointed by the government, to consider, in connection with a Military Committee, the expediency of forbidding entirely the construction of the tunnel. It was generally supposed that the company would suspend operations until these important committees had made their report, and the announcement of the cessation of work was actually made; but it appears that the great boring machine, which had just begun to prove its extraordinary powers, continued its functions without interruption, and before the deliberations of the Committees had come to a close the tunnel had made considerable progress to the southward. On discovering this the government caused an order of court to be issued to the effect that the excavation should be carried no further without the consent of the Board of Trade. Whether Sir Edward Watkin was gracious enough to pause a moment to see what the Board might have to say on the subject, we do not know, but presume that he did all that he supposed to be required of him. However that may be, the Board does not seem to have expressed any opinion, and Sir Edward, considering, no doubt, that silence gave consent, kept on again with his work, and had driven the excavation seventy-two yards nearer France before he was stopped by a peremptory order forbidding him to use the boring machine for any purpose without the written authority of the Board of Trade. Probably this will at last cause the abandonment of the enterprise; but with all regard for the popular terror we cannot help regretting that the tunnel had not advanced beyond the English jurisdiction before its projectors were overtaken by the mandate of the Court.

Two small leaks were discovered in the Hudson River Tunnel in one day last week, the first being serious enough to alarm the men at work, who made their escape in safety by the air-lock, leaving the superintendent to stop the leak as best he could with sand-bags. After some minutes of effort he succeeded in his attempt, and work was soon resumed. Thanks to the persistent courage of this brave man, although a considerable quantity of silt was forced in, no water entered the tunnel, and the company will be spared the cost of pumping out nearly a third of a mile of the completed excavation. As the depth of the tunnel beneath the surface increases, the pressure of water and silt will increase with it, and some difficulty may be met in resisting the strain, but we hope that no further serious accident will occur to interrupt the successful prosecution of the work.

According to the *Scientific American*, there were in this country in 1881 forty-four failures of railway bridges and trestles; and it expresses a hope that inventors will turn their attention to diminishing the number of such casualties by improved methods of construction. With all due respect for the good intentions of the *Scientific American*, we are convinced that it is quite mistaken as to the means necessary for remedying the disgraceful inefficiency of our ordinary railway constructions. The science of bridge-building is already quite far enough advanced to furnish rules for the designing and execution of bridges and trestles which shall have a definite strength adequate to resist the definite maximum strain which will come upon them, and the so-called engineers who are unable to put these rules in practice would make the same, or worse failures in endeavoring to apply an improved theory. There is something astonishing in the complacency with which the newspapers record the fact that a new iron highway bridge, supposed to be adequate to the heaviest traffic, with a factor of safety of six or seven, has fallen in under the weight of a cow, as happened not long ago; or that an iron railway-bridge, calculated, as one would imagine, for moving loads of hundreds of tons, has collapsed all alone by itself, immediately after completion, and under no strain whatever. In any other country the designer of such a structure would be held responsible for the damage caused by its fall, but the principle of professional responsibility is so little understood here that unless some person is killed by the catastrophe, the railroad or town engineer to whose incompetence the failure is due generally continues to draw his salary unmolested, his principals consoling themselves with the hope of "better luck next time."

Statistics recently published by the Census Bureau show a considerable change in the relative manufacturing importance of the larger cities of the United States. We have become so habituated to regarding Philadelphia as *par excellence* the manufacturing centre of the country that it is rather startling to find that the number of manufacturing establishments in New York and Brooklyn is very nearly double that in Philadelphia, and the annual value of the goods produced in them considerably more than twice as great. The annual product of New York alone is nearly one-half larger than that of Philadelphia, although, strangely enough, the capital invested in manufacturing is considerably less in the former city than in the latter. The ratio of the value of the annual product to the capital invested varies materially in a way which seems connected partly with the business habits of different localities, and partly with the nature of the manufactures carried on. In Chicago, for instance, with a capital of sixty-four millions, the value of the yearly out-put is two hundred and forty-one millions, or nearly as four to one; while Pittsburgh, with fifty millions invested, turns out only seventy-one millions annual product. In Boston, Brooklyn, Cleveland, Milwaukee, Newark, New York and San Francisco, the annual value of product is about three times the capital invested; in Baltimore, St. Louis, Buffalo, Cincinnati, Detroit, Washington and Philadelphia, it is about twice as great, while in Louisville, Pittsburgh and Providence it is less than that. Jersey City, probably on account of the delicate and costly character of the articles made there, produces every year a little less than sixty million dollars worth of goods with an invested capital of something over eleven millions.

Among the greatest advantages of the new Holland gas-burning locomotive is certainly its freedom from smoke. According to the account of the trial trip of the passenger engine *C. Holland* from Paterson to New York, as given in the Chicago *Tribune*, the windows of all the cars in the train, as soon as it arrived at the mouth of the Bergen Tunnel, which is about a mile long, were thrown wide open, and the products of combustion from the smoke-stack allowed to sweep through them. Instead of a whirlwind of suffocating gas and dust nothing was perceived except a cloud of vapor, without odor or admixture of dust, which condensed in fine spray, but left no stain or other unpleasant consequence. The trial trip was made, it seems, with the intention of testing only the power of the locomotive in maintaining a high pressure of steam, this being an essential point in locomotives of any kind. Economy of fuel, though important, is a subsequent consideration. For this reason the combustion was steadily maintained in full activity, and by this means the steam was kept at a uniform pressure of one hundred and forty pounds, the safety-valve blowing open on arrival at every station. With coal as fuel, the diminution of pressure is said to be usually about fifty pounds between the beginning and the end of the trip.

A most humane and thoughtful step has been taken by the government of the city of Leadville, Colorado, in ordering that all unidentified corpses brought to the city dead-house shall be embalmed, so that their features may be recognized even after the lapse of a considerable period. The peculiar situation and reputation of Leadville attracts to it multitudes of persons who have left their homes through despondency, wilfulness, or in consequence of some more or less innocent aberration, and it is said that not a day passes without the receipt at the police headquarters of letters of inquiry in regard to persons who have abandoned their families and friends, without leaving any clue to indicate the direction in which they have gone. In very many cases such wanderers arrive sooner or later at Leadville, often to die of disease or despair, and a large part, certainly, of these dying strangers leave behind them, in some distant place, wives, uncertain whether they are widows or not, heirs unable to touch their inheritance, and responsibilities of all kinds, which may affect the happiness and rights of many persons, but cannot be assumed by others without proof of the death of the one whose duty it is to bear them. For the relief of all such cases of hardship, as well as for furnishing a sad comfort to the friends of the unfortunate exiles, the plan of the Leadville authorities offers an invaluable resource. Few persons would be ingenious enough to hide themselves, unless death should intervene, for a very long time from the affectionate persistency of friends, or the trained skill of professional detectives, and the preservation of their mortal remains, even for a few weeks, in a condition to be recognized, may be in some respects only less important than their restoration to life.

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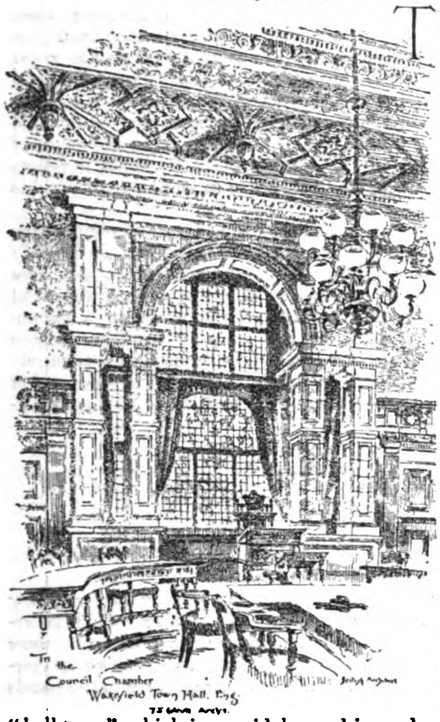
NOTES ON HOUSE-DRAINAGE. — IV.[1]

THE QUESTION OF TRAPS.



TO the average mind "traps" are the key to safe sanitary plumbing. Traps are certainly of absolute importance. At the same time, I question whether the defective ventilation of soil-pipes and the defective connection of their joints are not really a more serious, as they are a more occult, source of ill-health than are any ordinary imperfections of traps. The ordinary imperfections of traps, however, are serious enough to engage our most careful attention. It is not worth while, in the brief statement here proposed, to enter into all of the details concerning the different kinds of traps and their merits and demerits. It will suffice to say that the "bell-trap" which is so widely used is, under all circumstances, absolutely inadmissible in good work; that all traps which are materially larger than the pipes on which they are placed are seriously objectionable; and that the "bottle" trap of Boston is a survival of the unfittest portion of the ancient plumbing-work of that town.

In my judgment the acceptable traps of the present day are simple bends, in lead, iron or earthenware, of at least no greater diameter than that of the conduits of which they form a part (ventilated in case of need); some of the mechanical traps of which the orifices are closed by floating or weighted balls; and traps which depend for their permanent seal on the presence of mercury. All of these traps have merits for certain uses, and all may be reasonably relied upon to cut off communication between the soil-pipe and the house. From its simplicity and cheapness the simple bend trap holds, for uses to which it is suited or for which it is necessary, the first place. As ordinarily made its diameter is too great and the depth of its water-seal is too little; but this difficulty may easily be remedied. As ordinarily applied in house-drainage it is subject to the very serious danger of having its water withdrawn by suction (siphonage), when a strong flow through the soil-pipe or waste-pipe to which its own waste delivers creates a partial vacuum and causes the atmospheric pressure on the house side of the trap to force its contents forward toward the drain. A realization of the advantages of this trap and an observation of its frequent failure from the cause just described have led to the wide and general adoption, in the regulations of Boards of Health and in the recommendations of experts, of the principle of what is called "back ventilation." The best accepted illustrations of interior house-drainage include almost without exception a series of air-pipes leading from the top of each trap, either separately or in combination with each other, to the top of the house or to a point in the soil-pipe above the highest fixture connected with it. In some cities it is permitted to construct or to alter the plumbing-work of a house only in conformity with this plan. That such ventilation will efficiently correct the difficulty to which it is directed is quite certain, but that it has nevertheless some grave objections seems to me clear.

I object, in the first instance, to the serious increase it requires in the amount of lead pipe thus introduced into the drainage-work, lead pipes being subject to accidental defects, as for instance by the mis-driving of nails and the gnawing of rats, which indicate the propriety of limiting its use as much as possible. The extra cost of the work that the arrangement entails is by no means unimportant. Furthermore, and this is serious, it is found in practice that the free current of air established immediately over the water of the traps leads to its rapid evaporation, causing, under not unusual circumstances, a greater danger of unsealing from this cause than previously existed from siphonage.

Having long had the conviction that the requirement for universal back ventilation in the regulations of certain Boards of Health was ill-advised, I obtained authority from the National Board of Health to undertake an exhaustive series of experiments with a view to discovering the conditions under which siphonage would and would not take place. The results of these experiments were so at variance with the accepted theory that they were subsequently repeated, by order of the National Board, by E. S. Philbrick, Esq., C. E., in Boston, his arrangements being somewhat different from mine, but both arrangements being those usual in house-drainage. These experiments were carried on at the expense of the National Board and the results in detail cannot properly be published here. It may, however, not be amiss for me to say that my experiments indicated that sufficient security could be guaranteed by a thorough ventilation of the soil-pipe, and that, while Mr. Philbrick caused the siphonage of traps — not always, but sometimes — with a thoroughly ventilated soil-pipe, he did so with a combination of discharges from different vessels that would very rarely, if ever, occur in practice. Mr. Hellyer's experiments, in London, showed that, with a 3½″ soil-pipe, with full ventilation at the top and at the foot, it took ten discharges of a water-closet to cause a small trap connected with a lower point of the soil-pipe to lose three-sevenths of its 1¾″ seal.

With no desire to call into question the wisdom and propriety of the orders and regulations of established sanitary authorities, I cannot accept this requirement as being either necessary or judicious; and, although compelled to conform to it when working within the jurisdiction of such Boards of Health, I have very rarely in practice elsewhere met with a single instance in which it seemed to me necessary *for the purpose of preventing the unsealing of traps* to apply the system of back ventilation.

At least one practical expert who reviewed my experiments at the instance of the National Board reported that my results were fully in accordance with what he had himself concluded after much inspection of house-drainage work; but he regretted the conclusions at which I had arrived, for the reason that the prescribed back ventilation leads to a useful circulation of air through the whole system of lateral waste-pipes. Where it is important to establish such a circulation of air it may be wise to adopt the new method; but it should be done frankly for this object. Even then the work should, I think, be so modified as not to bring the current so near to the water of the trap as to facilitate its evaporation.

It was found in my experiments that while it was easy to protect lateral traps from the influence of currents passing down an open-mouthed soil-pipe, there was a frequent disturbance of minor traps when several vessels were attached to one small lateral waste. It becomes, in such cases, a question as to the propriety of preventing this disturbance by a back-ventilation or of adopting the alternative of using mechanical traps, which, however much they may be disturbed, cannot be permanently unsealed. My experiments showed that the desired end could always be secured by the use of mechanical traps.

The question is still by no means definitely settled. There can be no doubt that we shall in the future reach a better result than has thus far been attained. All that it is necessary for me now to say in the way of positive directions will perhaps be covered by an account of my own present practice. I use under water-closets, it being necessary with these to provide an unobstructed water-way of considerable size, a simple water-seal trap, this being sometimes, as with the plain hopper-closet, a deeply-bent lead trap with a good seal, and at other times, as with the Dececo or the California closet, a considerable depth of water in the bowl. It will very rarely happen that the water will be so much withdrawn from the trap under a hopper-closet in giving passage to air under suction that enough will not remain to reëstablish the seal after the suction ceases; with an open soil-pipe I think it will never happen. It will never happen that the volume of water retained in the bowl of the other varieties of closet named will be so far withdrawn as to unseal the trap. For all other connections I use mechanical traps. Where there is a considerable amount of lint, tea-leaves, or stringy matter, I use Bower's trap (a trap closed by a hollow india-rubber ball floated against the mouth of the inlet pipe). It is necessary so to arrange the drainage of the house that the suction of this trap will not be sufficient to remove so much of its water that the ball will not be held against its seat. There does exist the objection that the ball at times loses by corrosion that smoothness of its surface which is necessary to a tight joint, while sometimes by cracking or puncture the ball fills with water and sinks, leaving no greater security than would have been afforded by an unventilated bent trap. For other wastes, as those of wash-bowls and bath-tubs, I use Cudell's trap or one similar to it, where the inlet-pipe rises into a chamber in which lies a ball sinking by its own weight in the water held to complete the seal. The forms of all of these traps are such as to expose a considerable amount of fouling surface, and from the accumulation of foul matter the balls are undesirably subject to corrosion; but it is to be remembered that the exhalation from the soiled surfaces is on the soil-pipe side of the trap, and has no communication with the house, and that even a somewhat corroded ball lying against an orifice that is reached by the retained water forms a reasonably tight joint by capillary attraction, even when by siphonage the contents of the trap have been very largely withdrawn. It is idle to prophesy as to future improvements, but it would seem that in some better use of mercury than has thus far been suggested, or in an improved form of Cudell's trap, we shall attain more satisfactory conditions.

The greatest difficulty encountered in recommending modifications of the usual forms of work to practical plumbers is met in advising a reduction of the sizes of traps. So far as I know, no plumber in New York or Boston would think of using a trap less than 2″ in diameter under the kitchen sink of a large house. Many prefer a 3″ trap even where the waste is smaller. Opposition generally

[1] By George E. Waring, Jr., Newport, R. I.

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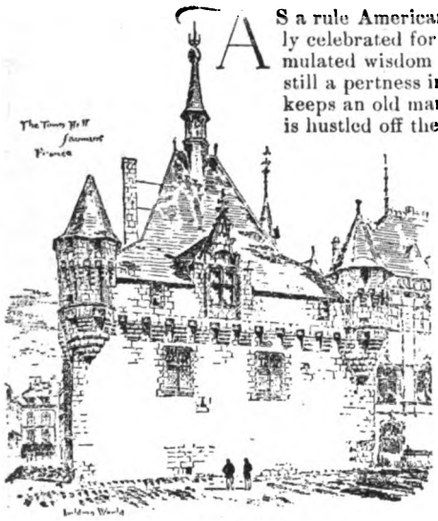
takes the form of the expression: "Why, such a trap will fill up in no time: I took out a 3" trap the other day and it was filled with grease as full as it could be." It seems at first blush incredible that matters which will be retained in the form of foul and obstructing deposits in a 2" trap or pipe will be completely removed if the diameter is reduced to 1" or to whatever will bring it within the easy flushing capacity of the stream to be supplied. Large bent traps have the great advantage over the Boston round or bottle trap that they do furnish a direct water-way without angles for the accumulation of deposit; but an inspection of either of these which has been for some time in use will elucidate the subject most clearly. In a rapid constant current obstructing matters, including congealing grease, are carried forward by the velocity of the stream. The velocity depends on the diameter of the channel through which a certain amount of water flows. If this amount of water passes through a three-inch channel with a velocity of *one* inch per second, it will flow through a one-inch channel with a velocity of *nine* inches per second. In the latter case it has sufficient power to carry with it everything that can go through the strainer of a sink, but at the lower velocity it will have no such power. Grease will, in congealing, attach itself to the sides of the channel; solids will settle in eddies of the current, and the trap or pipe will, little by little, become obstructed. Usually this obstruction goes on until the water-way is reduced to a size necessary to give the current enough velocity to carry its contents all with it. A dissection of an old three-inch kitchen-sink trap generally shows a mass of grease and filth through which a small, tortuous channel has been maintained by the force of the restricted current. If the diameter of the conduit itself is reduced at once to the diameter of such a self-constricted current, there will be no accumulation at any point. If accumulation occurs it means, not at all that the passage is too small, but that it is too large, and that the stream has itself been at work in reducing it to the proper size.

There is, so far as I know, no positive knowledge on which to base an exact rule for regulating the sizes of traps. Probably absolute cleanliness can be secured only by a greater reduction than has yet been attempted. It is my own practice, as at present advised, to use under laundry tubs, for the whole set, one 1½-inch trap; under a bath-tub a 1¼-inch trap, and under wash-bowls a 1-inch trap. The water-way of any of these is greater than the water-way through the strainer by which the discharge reaches them, and the fall or head due to their position increases their capacity.

AN ARCHITECTURAL MASQUERADE.



As a rule Americans have not been widely celebrated for respect for the accumulated wisdom of years, and there is still a pertness in our civilization that keeps an old man on his metal till he is hustled off the scene of action altogether. Now and then perhaps some jaded and thirsty poet of the town has warbled of the "old oaken bucket," or tired of the battle of life has sought rest in reminiscences of his "grandmother's arm-chair." But these were only episodes — the rush of the torrent of new civilization drowned the voice of the singer and his successor on the old farm, stuck labor-saving pumps into the wells, and banished the antique furniture to the garret.

That greater wealth and leisure, stimulated by the effect of foreign travel and example, should lead to some reaction in these matters is not unnatural. That the reaction should be extreme and its partisans enthusiastic, is in keeping with the national temperament. That the unreasoning gush over the "antique and horrible" should slop over in the magazines and newspapers is not surprising. The life of much of our periodical literature is in revolutions, revelations, resurrections, and alliterative records of commotion and crime.

So long as excited reformers confined their efforts to ransacking garrets there could be little harm done. It was rather amusing to be sure to see the drawing-room of modern indolence furnished with the spinning-wheels of an industrious ancestry, the wood-work shining in coats of fresh varnish. It mattered little, too, if the belle of the period, with her limp backbone, chose to loll on cushions and contemplate the uncomfortable chair in which her great-grandmother used to sit as bolt upright as if she had swallowed the ramrod of Bunker Hill.

The trifles raked out of garrets can be banished with the next pirouette of fashion to the dust heap or the junk shop; but the dry-rot of bad example has not been checked in its "furniture and bric-à-brac" stage, but creeps insidiously into the more sober and permanent work of the building architect.

In England the revival of an old style has given place to the revival of a later and debased one. In the hands of genius it is sometimes more than tolerable — like any style in such keeping. But in the hands of professional mediocrity or of unprofessional plagiarism it is guilty of more hideous nightmare effects than the worst disciples of "white-pine Greek" or later "Vernacular" ever dreamed of; even the carpenter's "mansard" seems quietly elegant by contrast. In such hands it becomes a vulgarly ornate and elaborated travesty of work whose greatest virtue was simplicity—the robes of harlequin on Benjamin Franklin. "What is age? What is venerableness," as old Eccles exclaims, if they are to be abased after this fashion?

While cherishing a keen appreciation of the charms of picturesque age; while admiring to the fullest extent the many virtues of early American builders and their English contemporaries, let us not be blind to their defects or try to confine our new wine in their old bottles. They aimed to satisfy certain simple needs in a simple straightforward manner, guided by the lamp of tradition, whose somewhat feeble glimmer in a new atmosphere, constrained them always to work deliberately and often rudely. It is not of the earliest settlers that we are treating: there is little of interest to the archæologist in the pioneer's shelter.

> "His home was a freezing cabin
> Too bare for the hungry rat;
> Its roof was thatched with ragged grass,
> And bald enough at that;
> The hole that served for casement
> Was glazed with an ancient hat;
> And the ice was gently thawing
> From the log whereon he sat."

But the "frame house" promptly succeeded the log one, and fifty years showed marked progress in the art of building. Still the architectural features, where there was any pretence to such, were borrowed from the "old home;" and certain simple text-books containing free renderings of the Roman Orders, etc., were in the hands of these architect-builders.

In many instances the oak frame, the panelling, the stairs, mantles, and the exterior decorative features were imported complete from Old England. This work was copied and interpreted by intelligent carpenters who took an honest pride in their calling, put thought into their work and labored long days; but never thought of raising a frame with less motive power than a barrel of Old Jamaica. The power must have been ample, for they often put the biggest timber in the roof.

Every architect of experience is more or less familiar with this early work and must have a certain respect for it and its constructors. From their merits and their defects some sound lessons may be drawn; but to assert, as has been done, that their architecture is in any general sense, a high standard of beauty, convenience, or scientific construction, as applied to the proper solution of the problems of our day, is simply the babble of ignorance. The success of their edifices as works of art can easily be determined by careful examination, which, however, must be kept free from the effect of personal association and the poetic glamor of age and tradition — influences liable to warp the judgment when an old building becomes the subject of critical analysis. On questions concerning their planning and construction the architect and builder are almost the only competent witnesses; and this simply because the remaining examples are mostly tenanted, and can seldom be intelligently examined unless in process of repair or demolition.

From one to two hundred years ago pine lumber was plenty and the trees were large, and it was chiefly used on account of the ease with which it could be worked: otherwise English emigrants would have always used the traditional oak. To save labor the sticks were left about square in section and unnecessarily heavy, which caused them to deflect with their own weight. The timber was sometimes rightly cut and seasoned, when it endured; and sometimes it was cut out of season and used hurriedly, when it suffered from dry-rot. Covering boards were irregular in thickness, of great width and with wany edges, with wide irregular gaps between; and the shingles, being of a rude manufacture, and sheathing paper unknown, the drifting rain and snow filtered through the roofs into the garrets. Windows seldom opened at the top, and wide-mouthed fireplaces drew their supply of air from numerous cracks and crevices. Occasionally a cargo of good bricks was imported from England, but the domestic substitute was irregular in shape and size, small, and imperfectly burned. Wood was freely used in the construction of chimneys in the shape of lintels, bond-timbers, and springing-pieces for trimmer-arches. Many old houses owe their destruction to this cause alone. The mortar was often of poor materials and badly mixed. The plastering on split laths, which were often laid so close together as to prevent any proper key, was occasionally strong but as a rule weak and irregular in surface.

As for plan the dwellings of the common type aspired to nothing of the sort. They were simply an aggregation of rooms. A large proportion had two rooms on each floor, with a big chimney in or near the centre between them, and a steep narrow staircase against the chimney in front. The roof was sometimes low and hipped, but often pitched or gambrel in style. Small dormer windows were sometimes found in the gambrel roofs and now and then in the pitched. There is one old house on the island of Nantucket with a genuine mansard roof: doubtless the special importation of some ancient mariner.

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If the family outgrew the earlier accommodations the attics were finished, Ls or lean-tos were added *ad libitum*, as barnacles collect on a bit of drift-wood. The aggregate was often picturesque. In the original façade there was generally some attempt at a balance of parts but rarely symmetry, and the effect was generally better on this account. Privacy seems to have been of as little account in a New England farm-house as in an Italian villa. Rooms served for passages, and stairways started from rooms and ended in them.

An old house near Boston, with the general arrangement just described of two rooms on each floor, served for years as a stage tavern — guests, landlord, and family, servants, kitchen, bar, beds: all in four small low-studded rooms.

Bathing facilities, except the horse-trough and "old oaken bucket," were little known and less cared for. The surface of the ground served as drain and cesspool. Privies were often roomy, both as to superstructure and vault, and generally located "convenient" to the well.

Closets were few and small, clothing being stored in chests. Stories were commonly about seven feet high in the clear, and rooms were imperfectly lighted by few and small windows with semi-transparent bulls-eye glass. The low stories served to make the narrow crooked stairs less dangerous.

As for cellars there were either none worthy of the name, and the sills were set almost on the ground, or they were ill-lighted and unventilated pits, often flooded in spring, always musty and sometimes with rank growth of fungi. These cellars had sometimes inner and lower depths, the terror of the childish mind, where milk and butter were stored. As for cellar stairs, — for the credit of our ancestors the less said of them the better. It would be morbidly interesting to have the statistics of doctors and undertakers concerning them.

Doors were thin, often not more than one inch in thickness, narrow and low, with rude strap-hinges that encouraged sagging. Outside doors were more liberal, but gained their swinging room at the expense of an already cramped front entry. Sometimes liberal porches occur, but oftener there was no protection from the weather but a scanty false pediment; but as front doors were rarely locked there was no necessity for any one to remain outside.

The limited number of town and country houses of the better sort are harder to classify. More erratic in style and individual in plan they seem to have been combined of fragments of the larger English work with bits of cottage or farm-house tacked on. The examples of a complete and harmonious plan are very rare. A good front hall and staircase were often supplemented by a dark, narrow and crooked back stair. The roominess and liberality of parlor and sitting-rooms were shabbily supplemented by odd holes and corners in upper stories and L. There were surprises in the shape of odd steps and unexpected changes of level charming in a sketch or a romance, but inconvenient and dangerous in every-day life.

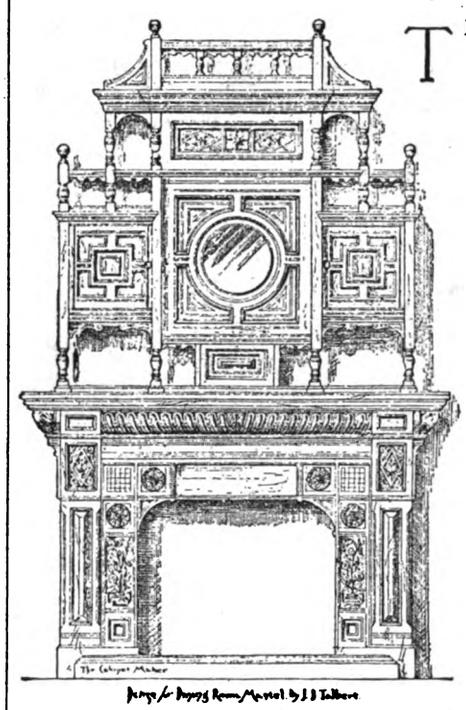
The decorative features externally were almost invariably false and unconstructional: poor imitations of stone-work in thin wood. There was little attempt at real deception, however: that the pilasters and cornices were pine shells was evident to the most careless observer.

In characteristic treatment of parts these houses were generally defective. Outward forms seldom indicated the inward uses. This is partly accounted for by lack of caste in the family, the servant, or help, being the peer of master and mistress.

Examples might be almost indefinitely multiplied to illustrate many interesting points connected with this early building; but it would all simply tend to show that our ancestors were a frugal, simple, out-door living people. Like the laborers in the streets and fields to-day, they were so fortified by their manner of life that they were proof against ordinary exposure. Neither their houses, nor their garments, nor their religion, nor their schools, nor their eating and drinking will answer the needs of to-day. "Nor is it meet they should." In the early days of Nantucket a young mother trudged seven miles through the primeval forest, carrying a full-weight colonial baby, merely to make a friendly visit to a neighbor, and then trudged cheerfully back at night. As well pattern the dwellings of to-day after the wigwam of the Indian as after the dwellings of such a race, unless we are prepared to return to the Spartan simplicity of their daily life. Until we are ready to accept this alternative let us cease to masquerade in the garments of a dead civilization. A little of their old sturdy, honest spirit will not hurt us, but we cannot make any fitting use of their wardrobe. J. A. F.

DETERMINATION OF CARBONIC ACID IN AIR — The following method of determining the quantity of carbonic acid in atmospheric air has been proposed by M. Mascart, the method being based on the diminution of pressure which takes place when a certain quantity of air is deprived of its carbonic acid, the temperature and the volume remaining constant. The air to be analyzed is deprived of the water vapors which it contains, and is then introduced into the reservoir of a gas thermometer. A second reservoir, similar to the first, contains the same quantity of air, and is in communication with the first by means of a mercury manometer. These two reservoirs are placed in a water bath, so as to both be at the same temperature, and the difference in pressure of the two is taken. By means of a mercury pump the air to be analyzed is then pumped out and led slowly over potash, and then into an auxiliary tube, from which it is led again into the reservoir. When the height of the mercury in the second apparatus is the same as it was at the beginning of the operation the difference in pressure will give the amount of carbonic acid which was present.

THE WHITE-PINE SUPPLY.



THE *American Architect* thinks it is to be deplored that the figures of the census bureau have not received the attention which they deserve, and thinks that they will not until the advancing cost of pine lumber brings the lesson home forcibly to the public mind. It claims to see as a result of the publication of these figures a doubling up in the price of pine lands within a few weeks, and it says that the question of the employment of some other material for the coarser uses of building is earnestly discussed among architects and contractors. The New York *Tribune*, that stands ready at all times to give any amount of space to sophomoric swash, has had its ninth-story philosopher moralizing on the government timber figures, and drawing the conclusion that very soon the people of America will look upon a pine board as a relic of the past.

It would be possible for these papers, and all others that swear by the figures issued by government, to know more about the pine supply than these figures teach them. It is easy enough for publications and individuals who know no better to imagine there is no more white pine in the North-west than estimated by government; but when these publications and individuals set up a cry of a short supply, and argue that in from eight to fourteen years the pine forests will be denuded, the influence is a pernicious one from the fact that the data upon which the argument is founded is incorrect. Such theorizing tends to create fictitious values and a scare when there is no necessity for either.

The *Lumberman* has not before criticized the government figures, and it had hoped it would have no occasion to criticize them. If government wanted to indulge in the making of forestry bulletins it had a right to do so. If it wanted to effect a knowledge of the amount of standing pine in Michigan, Wisconsin and Minnesota — a thing that many a man who knows more about the timber supply of those states than the entire census force would not attempt to do — it certainly had a right to do it. At any rate it certainly did it, and the hopes of this paper were that instead of working evil the figures would drop into that oblivion that swallows up so much statistical work.

The *Lumberman* considers, and knows, that on the whole the figures presented by the census bureau are misleading and erroneous, yet it counts itself too wise to make figures of its own, and show therefrom wherein government has erred. Time has given the lie to every prophet who years ago displayed his wisdom by telling how much pine there was, and there is no reason to think that the latter day prophets are any wiser. These wise ones began on Maine. They figured up to a foot how much pine there was and how long it would last, yet to-day without doubt there is as much pine in the state as the entire amount was estimated at ten years ago. They then tried a hand on Pennsylvania. They denuded the Keystone state over and over again. They made it appear years and years ago that the mill men at Williamsport, Lockhaven, Whitehaven and elsewhere would very soon be obliged to quit the manufacture of lumber and engage in other business. The mills at those points are running as lively as ever, and promise to keep up the same gait for years to come. Seven years ago estimates were made for Pennsylvania at less than 3,000,000,000 feet, and the figures went the round of the press as gospel truth. A great many million feet have been cut during those seven years, and men who know as much about the supply as men knew seven years ago, more than double the previous figures. The same class of chronic denuders then attacked the lower peninsula of Michigan. Twenty years ago they labored hard to have all the pine cut off in ten or twelve years, especially in the Saginaw district. As many as ten years ago one of the leading mill men of Saginaw called his nephew into the office and told him solemnly that the pine supply in that section was about exhausted, and as a matter of business it would be wise to invest their surplus money in pine in another state. The gentleman showed the same kind of wisdom displayed by others of his ilk, for within ten years the Saginaw valley mills have turned out nearly 7,000,000,000 feet of lumber, and the cut last year was the largest in the history of the mills.

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Time, as has been stated, has given the lie to all the estimates that have been made, and it is to be regretted that government has taken a position that time will force it to abandon.

It may be well to first call attention to the estimates given of the pine supply of the upper peninsula of Michigan. The figures are put at 6,000,000,000 feet. The mills at Marinette and Menominee have not cut a billion feet since the operators at that point openly stated that they owned 12,000,000,000 feet of standing pine in the Menominee district, and the leading manufacturers there do not hesitate to say that with safety the government figures may be multiplied by two. In Wisconsin hap-hazard work was performed. One tract of land recently changed hands that had upon it 3,000,000,000 feet, yet those 3,000,000,000 feet never entered into the calculation of the government mathematician. From another tract that was estimated at less than 75,000,000 feet have already been sold nearly 400,000,000 feet, and another 100,000,000—a part of the same tract — may be purchased by any man who desires to invest in pine lands, and who has money enough to buy it. Work containing such glaring errors may receive the stamp of government, but nothing is more certain than that when government condescends to so stamp it it gives circulation to a base coin.

Minnesota is given at 6,000,000,000 feet. It would be satisfying if the government agents would rise and explain how they obtained the figures. When in northern Minnesota there are thousands of acres of pine lands that have never even been surveyed, it would be a satisfaction to know how the government agents know so much more than some other people about the timber it has. It would be well also for these "experts" to explain why on the Minnesota forestry bulletin all that territory lying north of Itaska county, stretching to the right of Fort Francis and to the left to the Lake of the Woods, is left white, indicating that it has no pine, when every timber-looker who has tramped through that country knows that it has pine. During the past ten years the mills upon the upper Mississippi have cut in round numbers 2,092,000,000 feet of lumber, the amount ranging from 170,000,000 in 1872 to 355,000,000 in 1881, and now government steps to the fore and sagely assures us that there are but 2,900,000,000 feet of timber remaining upon the Mississippi river and its tributaries. It must be an amusing piece of news to the operators on the upper Mississippi, who expect to be able to carry on the manufacture of lumber in its present proportions for the next twenty years, who are supposed to know about how much timber they own, and who are conscious at the same time that they do not own all there is upon that river and the streams emptying into it. A state land-examiner remarked on seeing the forestry bulletin that the census agents evidently knew as much about the standing pine of Minnesota as a boot-black, and no more — not complimentary testimony to come from a man who for years has been familiar with a considerable portion of the forests of his state. The figures given for the other districts of Minnesota are open to the severest criticism. In fact the putting forth of such figures as are contained in the Minnesota forestry bulletin is a piece of peerless arrogance. The *Lumberman* will stake its reputation that before the pine forests of Minnesota shall have been exhausted, a record of the output of lumber of that state will cause the government agent to seriously regret that he did not treble his figures.

There are valid reasons, perhaps, why the figures issued by the census department, and alleged to represent the amount of pine standing in the North-west, are by far too small. There are men who cannot consider a question equitably. They form a conclusion in advance and aim to make every argument support it. There are dealers in the Chicago lumber market who will be bulls, and others who will be bears, to the end of life, regardless of any facts or arguments which may exist or be presented. The *Lumberman* has none but feelings of friendship toward the gentleman who had in charge the making of the forestry bulletins of Michigan, Wisconsin and Minnesota; at the same time its judgment would not select him as a man who would do justice to the great work which he attempted to do. By instinct, association and policy he trains with the large body of men whose pockets demand that the price of pine lands be forced to the highest possible notch. For years he has been a pine-land agent and speculator, and the advance in pine has been his bread and butter. And it would be of interest to know what proportions of the figures, which in the aggregate make up the forestry bulletins, were made by men who have, or had, at the time of making them pine lands to sell. It would be of interest to know who made the larger half,—the men who saw a chance to bull the lumber and pine-land market, or the other men, who made their estimates with the one object in sight, that the country should be informed of the real condition of the white-pine supply.

The figures presented in the forestry bulletins of the three states under consideration are working mischief every day: hence the design of the *Lumberman* to call the attention of all who are interested in the great lumber industry to the palpable fact that they misrepresent. It is an unpleasant task. It would be much more agreeable to settle down to the conclusion, were such a thing possible, that, when government puts "experts" at work in any field with the necessary means at their command to work with, their work approaches approximate accuracy. But in this particular case the sooner the people disabuse their minds of the idea that such accuracy was reached the wiser they will be regarding the amount of standing pine. —*The Northwestern Lumberman.*

THE LUMBERING INDUSTRY.

PROFESSOR SARGENT'S Forestry Bulletin No. 17, issued by the census office, is in the form of a table representing the volume, by states and territories, of the lumber industry of the United States for the census year, as derived from the returns of the enumerators on the schedules of manufactures, and from the reports of special agents for manufactures in cities having at the time of the ninth census, 8,000 or more inhabitants. No distinction between the different kinds of wood sawed has been attempted in the enumeration. A comprehensive idea of the magnitude of the lumber industry is thus given. It appears that in the United States the number of establishments for the manufacture of lumber is 25,708, employing a capital of $181,186,122. The statement of the number of hands employed in these establishments exhibits the following average: Males, above 16 years, 141,564; females above 15 years, 425; children, and youths, 5,967. The value of logs used amounted to $139,836,869; value of mill supplies, $6,318,516; wages paid during the year, $31,845,974. The following table exhibits the various products:

Feet of lumber (board measure)	18,091,356,000
Number of laths	1,761,788,000
Number of shingles	5,555,946,060
Number of staves	1,218,226,000
Number of sets of headings	146,523,000
Feet of spool and bobbin stock (board measure)	34,076,000
Value of all other products	$2,682,668
Total value of all products	$233,367,729

Of the 47 states and territories Pennsylvania ranks first in the number of establishments with 2,827, followed closely by New York 2,822. Then comes Ohio with 2,352, Indiana with 2,022, and Michigan with 1,649. Of the southern states Virginia stands at the head with 907. The six New England stand as follows: Maine with 848, New Hampshire with 680, Vermont with 688. Massachusetts with 606, Rhode Island with 49, and Connecticut with 300.

The number of establishments, however, give no idea of the magnitude of the industry in the several states, as, according to the amount of capital employed, Michigan stands far ahead, with $39,260,428, Pennsylvania coming next with $21,418,588, followed by Wisconsin with $19,824,059, and New York with $13,230,934. Ohio which stands third in the number of establishments, employs a capital of $7,944,412. California, with its large way of doing things, employs a capital of $6,454,718 for 251 establishments, the cutting up of its monster trees being a work of considerable magnitude. The industry has not taken a deep root in Oregon as yet, considering that it has the most magnificent forests in America, for it has 228 establishments, with a capital of $1,577,875. Of the New England states Maine employs a capital of $6,339,396; New Hampshire, $3,745,790; Vermont, $3,274.250; Massachusetts, $2,480,340; Rhode Island, $144.250; Connecticut, $657,300. The first four, it is thus shown, rank high, considering their size.

In the matter of the total value of all products Michigan again stands way ahead with the figure of $52,449,928; followed by Pennsylvania, with $22,457,359; Wisconsin, with $17,952.347; New York, with $14,365,910; Indiana, with $14,260,830; Ohio, with $13,864,460. Of the New England states, Maine makes the fine showing of $7,933,868, ranking next to Ohio. The total value of New Hampshire's products is $3,844,012; of Vermont's, $3,258,816; Massachusetts', $3,120,184; Rhode Island's, $240,579; Connecticut's, $1,076,455.

In the number of feet of lumber produced, Michigan stands first with 4,172,572,000, followed by Pennsylvania, with 1,733.844,000; Wisconsin, with 1,542.021,000, and New York, with 1,184,220,000. Maine produced 566,656,000; New Hampshire, 292,267,000; Vermont, 322,942,000, and Massachusetts, 205,244,000. The products of Massachusetts included 26,000,000 feet lumber, 11,982,000 laths, and 127,591,000 shingles, manufactured from logs cut in New Hampshire and Vermont.

THE ILLUSTRATIONS.

COTTAGE NEAR SHORT HILLS, N. J. MR. W. A. BATES, ARCHITECT, NEW YORK, N. Y.

SKETCH FOR A HOUSE FOR H. BURNETT, ESQ., ST. LOUIS, MO. MESSRS. BURNHAM & ROOT, ARCHITECTS, CHICAGO, ILL.

HOUSE FOR H. POWELL, ESQ., MT. AUBURN, CINCINNATI, O. MR. SAMUEL HANNAFORD, ARCHITECT, CINCINNATI, O.

WAREHOUSE, PITTSBURGH, PA. MR. W. S. FRASER, ARCHITECT.

AMERICAN ARCHITECT COMPETITION—NEW SERIES.

AS the vacation-season is about closing and the approaching cooler weather offers encouragement for undertaking extra work out of office-hours, we think it a proper time to announce the following short and simple programme:

A correspondent some time ago complained of the inappropriate

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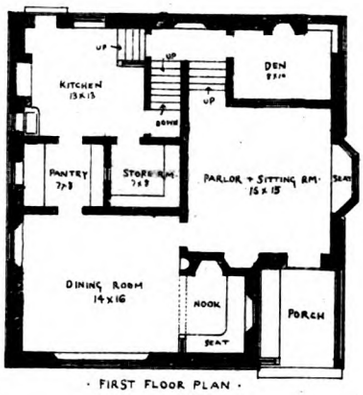
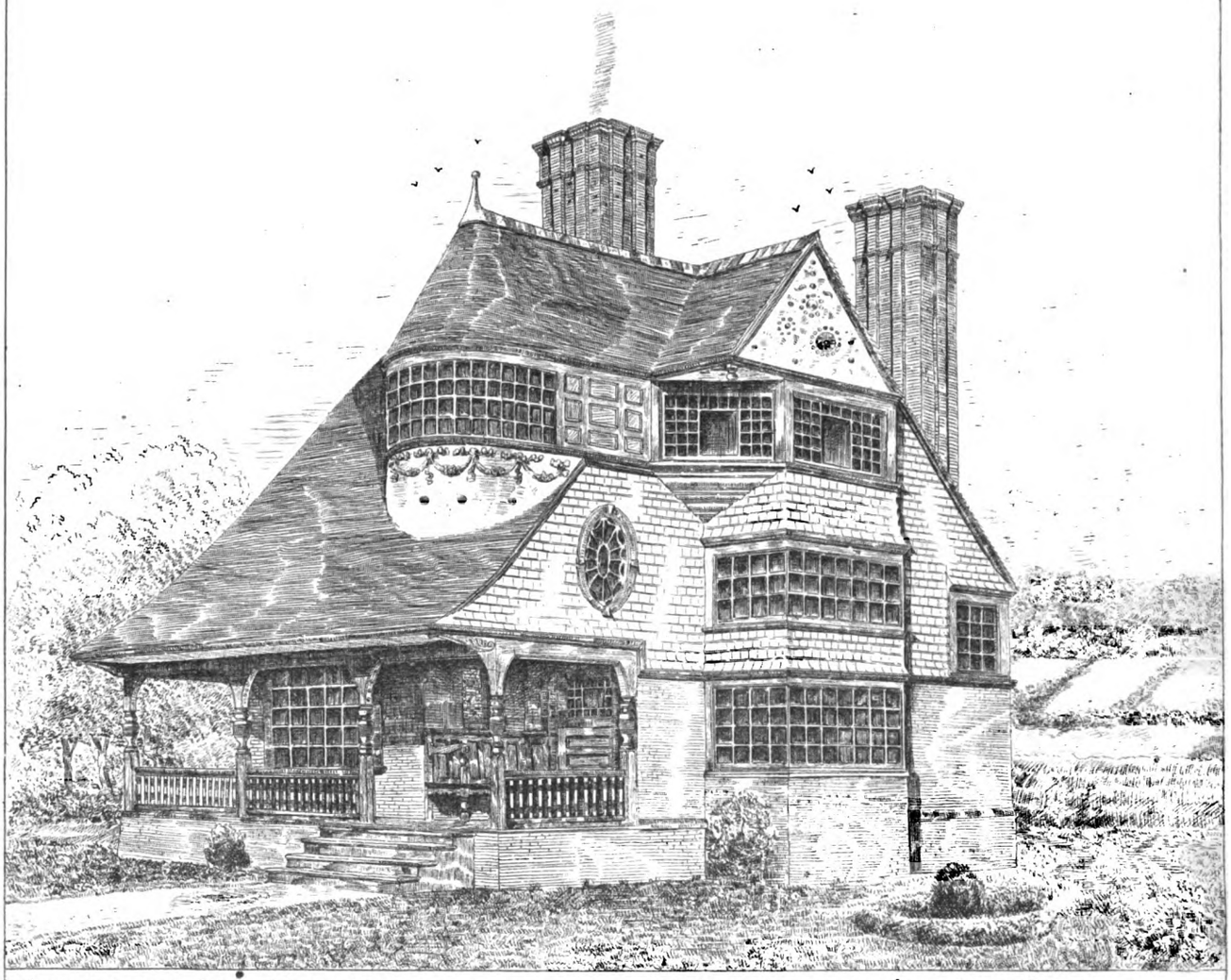


FIRST FLOOR PLAN.



COTTAGE NEAR SHORT HILLS NEW JERSEY

WM. A. BATES ARCHT. 149 B'WAY. N. YORK

The Heliotype Printing Co. 211 Devonshire St. Boston.

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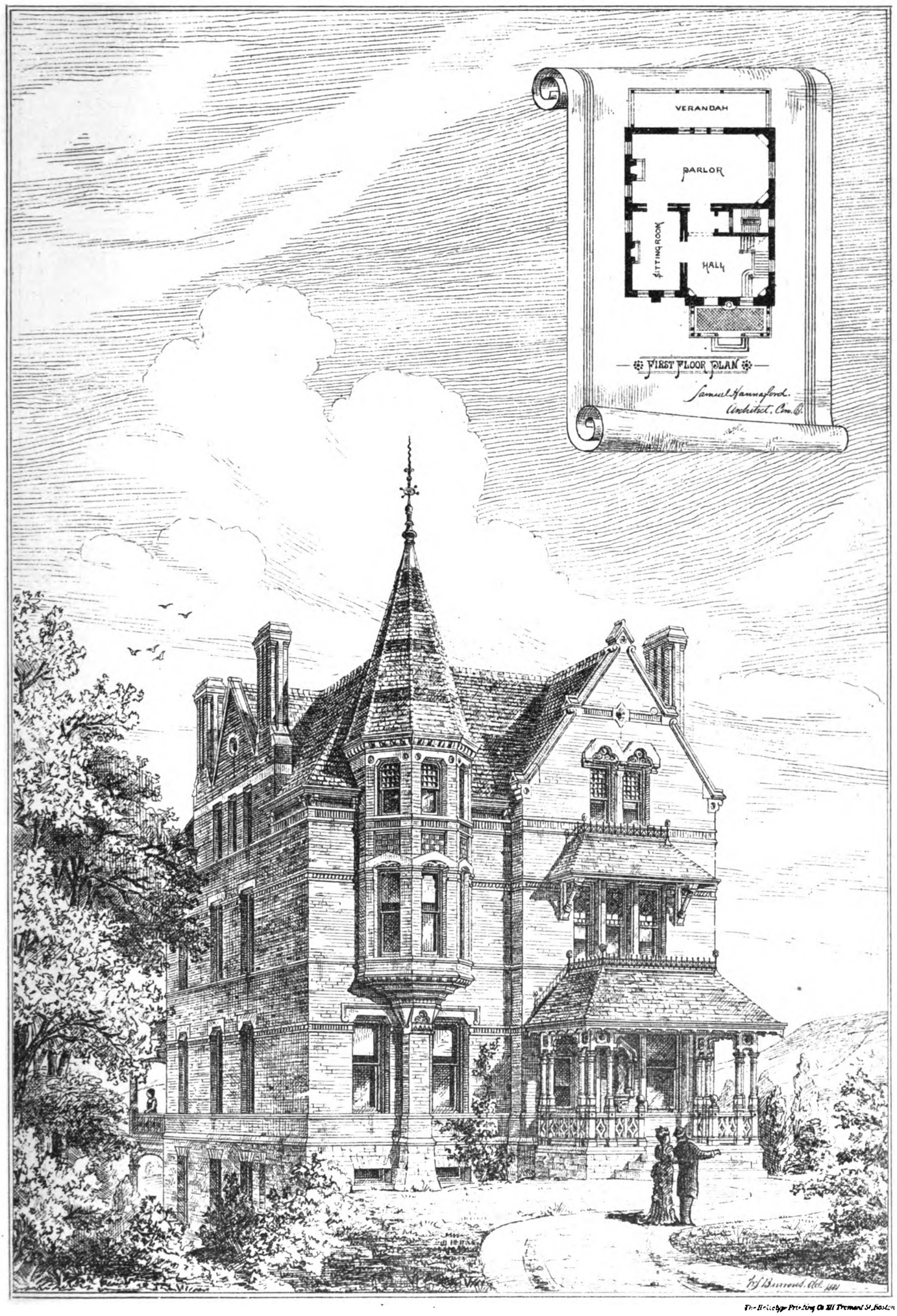

RESIDENCE FOR HENRY POWELL, ESQ.
MT. AUBURN.

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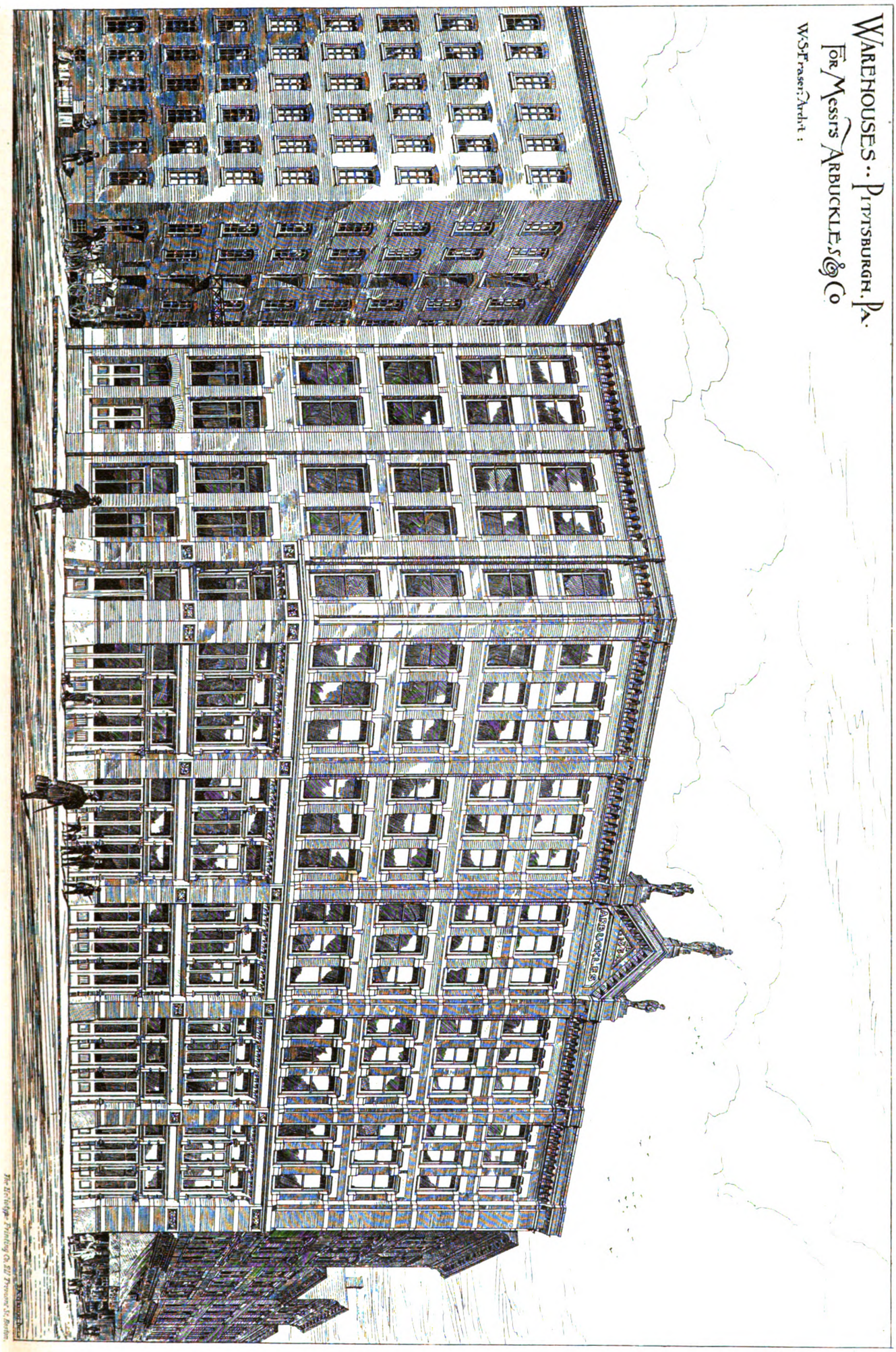

WAREHOUSES - PITTSBURGH, PA.
FOR MESSRS ARBUCKLE & CO
W. S. Fraser, Archt.

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ness of the designs habitually used by iron-workers, and we therefore ask our contributors to do what they can to right this wrong by submitting competitive designs for two pieces of iron-work, one to be executed wholly in wrought-iron and the other to be wholly or in part of cast-iron. The subject of these designs is left entirely to the fancy of the competitor, — designs for gates, posts, railings, balustrades, lamp-posts, balconies, brackets, chandeliers, crestings, locks, knockers, capitals or any other object that can be executed in iron being held equally to the purpose.

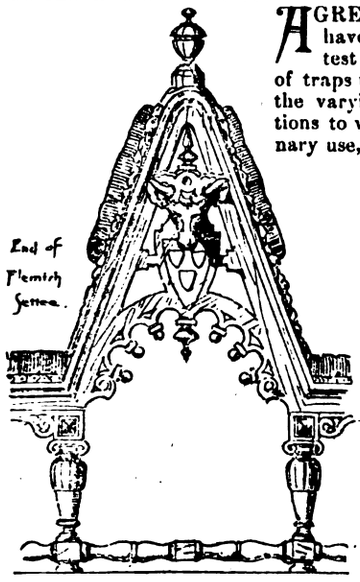
Both of the designs, executed in pen-and-ink, are to be shown on the same sheet of paper 14″ x 22″, each design being explained by the details and sections necessary to show clearly the manner of its construction.

As the subject of the competition is not as in former competitions definitely fixed, we will do what we can to lighten the labors of the jury of award by increasing the number of prizes, and we therefore offer five [or less] equal prizes of twenty dollars each, to be awarded to the best five [or less] designs, provided the jury finds designs of sufficient merit.

Drawings must be received at the office of the *American Architect*, 211 Tremont Street, Boston, on or before Saturday, October 14, 1882.

THE SIPHONAGE AND VENTILATION OF TRAPS.[1]

TO THE NATIONAL BOARD OF HEALTH, WASHINGTON, D. C.: —



AGREEABLY to your request, we have made sundry experiments to test the efficacy of various styles of traps used upon house-drains under the varying circumstances and conditions to which they are subject in ordinary use, especially with the view to ascertain the liability of such traps to lose their water-seal by siphon action.

For this purpose a typical stack of 4″ and another of 2″ waste-pipes were erected in a vertical position, extending 57′ 6″ above the basement floor, with branches in the basement and on the floors above, and having the upper ends open to the air 8′ 3″ above the upper floor.

The vertical pipes extended down to a point 2′ above the basement floor, from which they turned to a slope, falling this 2′ in a horizontal distance of 32′.

The 2″ waste joined the 4″ pipe at a branch on this slope 5′ 6″ from the lower end of the vertical portion. A 4″ running-trap was attached at the lower end of the slope, having a 4″ air-hole close above it, to represent the foot-ventilation. At a point on the slope 6′ below the lower end of the vertical reach a branch was inserted with a 4″ trap in it marked (*n*) on the plate, to represent an inlet for a basement water-closet or for any other desired fixture at that level. The relative position of these branches and floors is shown on the accompanying plate.

Traps may lose their water-seal by siphon action, *i. e.*, by lack of air-pressure, either when water is poured through them, or when poured through the main waste-pipe into which they discharge, from fixtures at a higher level. These two processes were therefore examined separately, as described below.

Since it is now generally admitted that the upper ends of all soil or waste pipes should be wide open to the air, all experiments were tried under this condition except where otherwise noted for special purposes there explained.

We are indebted to the courtesy of the managers of the Massachusetts Charitable Mechanics' Association for the use of their fine building for these experiments.

We will first consider the loss of the water-seal in traps caused by water flowing through them from the fixtures attached thereto.

A — EXPERIMENTS WITH A TWO-INCH WASTE-PIPE OPEN AT THE TOP.

(1) A conical hopper was placed at the upper floor, over the 2″ S-trap at (*e*), having 1⅝″ depth of seal and having a branch of 2″ calibre 21″ long, with a descent of 1′, before joining the Y-branch on the main at *D*.

This trap was found to lose its seal completely every time a two-gallon pail was emptied into the hopper, unless pains were taken to pour the last part of the water slowly, by which the seal might with care be restored.

(2) Smaller quantities of water were then poured in quickly, as is often done in practice, with the following results: —

Quantities poured in. Depth in bottom of pail.	Loss of water in trap.	
3 inches	1⅝ inches.	Seal lost.
2 "	1⅛ "	" "
1½ "	⅞ "	" "
1¼ "	¾ "	" "
1 "	½ "	" "
¾ "	⅜ "	" "
½ "	¼ "	" "

(3) In order to test the effect of a strainer in retaining the water by checking the flow, two cross-bars were then inserted just above the trap-water to represent a bar-strainer. Water to the amount of 1¼″ in depth in the bottom of a pail was then poured into the hopper, but the trap still lost its seal, the water in it being lowered 1⅜″.

(4) To test the effect of a vent-pipe on this combination a hole was cut at the crown of the trap and one end of a lead pipe of 1″ calibre and 28′ 6″ in length was coupled to it. The pipe lay in a coil on the floor with the other end wide open. Nine full pails of water were then emptied into the hopper, the loss of water from the trap on measurement being found to be as follows, after each pailful, viz.: 1¼″, ½″, ⅞″, ½″, ⅝″, 1⅝″, 1¾″, ½″, 0″. The seal was lost twice.

The manner in which the water was poured influenced the result materially: less water was lost if it hit on one side of the hopper and whirled about during its downward flow than if it was poured in directly towards the centre without such spiral motion.

(5) The vent-hole was then enlarged and a coil of pipe of 1½″ calibre was coupled to it, having a length of 50′. Ten pailfuls were then quickly poured into the hopper in succession, finding the loss of water in the trap after each as follows, the strainer remaining at the bottom of the hopper: 1″ 5 times, ⅝″ twice, ¼″ once, ⅛″ twice, so that there was always at least ⅝″ of water-seal remaining. A shorter vent-pipe of the same size, or a larger one of same length would of course produce better results by lessening the friction encountered.

(6) Closing the vent-hole, an ordinary wash-bowl was then placed over the same trap, having an outlet of 1¼″ diameter with a bar strainer. It was filled several times and discharged without losing any water that could be detected from the trap. Such traps often do lose their water, however, in practice, when discharging into smaller wastes under circumstances otherwise similar except as to the cleanness of the interior of the pipes.

B — EXPERIMENTS WITH A FOUR-INCH WASTE OR SOIL PIPE, OPEN AT THE TOP.

(1) A conical hopper was placed on the third floor on the 4″ S-trap at *b*, having a water-seal of 1⅞″, with a branch 22″ long between the trap and the Y-branch on the main.

Five pailfuls in succession were poured into the hopper with loss of water as stated below, viz.: ⅝″, 3¼″, 2⅜″, ¾″, 2⅝″. The seal was thus lost three times out of the five. Smaller quantities of water were then poured in with the following results, viz.: —

Quantitities of water in bottom of two-gallon pail.	Loss of depth in trap-water.	
Half full	2 inches.	Seal lost.
3½ inches deep	1⅛ "	
3½ " "	2 "	" "
5 " "	3⅜ "	" "
3 " "	2⅛ "	" "

(2) A vent-pipe 1½″ diameter and 1′ long was then inserted in the upper side of the pipe 6″ below the crown of the trap, and ten pails discharged in succession with the result of losing the seal completely three times and leaving but ⅛″ seal two other times, while the remaining five trials lowered the water respectively ¾″, 1½″, ⅞″, 1⅜″ and 1¼″.

(3) The size of the vent was increased to 2″. Six successive pailfuls were emptied, lowering the trap-water as follows, viz.: 1″, 1¼″, ⅞″, 1¾″, 1⅛″, 2⅛″, the last losing the seal.

(4) The vent-pipe was then increased to 3″ in diameter, still 1′ long. Ten successive pailfuls were emptied with losses of trap-water as follows, viz.: 1⅜″, 1½″, 1½″, 1″, ⅞″, ⅞″, 1⅞″, 1½″, 1⅛″, 1¼″, the seal being lost once.

(5) This vent-hole was then sealed up, restoring the original form of the pipe as far as possible, and another vent-pipe of 1½″ diameter and 1′ in length was inserted on the highest part or crown of the trap. Nine successive pails were emptied with loss of water in the trap as follows, viz.: 1½″ 2⅜″, 2″, 1″, 2¼″, ¾″, ½″, 1¼″, 1¼″. The seal was thus lost three times out of nine.

(6) The vent-pipe, still 1′ long, was then enlarged to 2″, with an elbow 2″ long at its upper end. Ten pailfuls in succession were emptied with the following losses in the trap, viz.: 1 1/16″, 1⅛″, 1¼″, 2¼″, 1⅝″, ½″, 1½″, ¼″, 2¼″. The seal was here twice lost and came very near it twice more.

(7) The vent-pipe, 1′ long, was then increased to 3″ diameter. Ten pails were emptied with loss of water as follows: ½″, ⅝″, ⅞″, ¾″, 1½″, 1″, ¾″, ¼″, ¾″, 1½″. The seal was not lost now, though coming within ⅜″ of it.

In all these last three experiments, where the vent was in the crown of the trap, the water was seen to dash up into the vent-pipe and spill over the top of it, even when 1′ long and 3″ in diameter. When it receded a portion of this water dropped back into the trap and just sufficed to keep its seal where the vent was 3″ in diameter, but not when smaller. The loss of water was plainly attributable to the momentum of the stream when passing through the trap quite as much as to the air draught. This was proved by varying the direc-

[1] A Report to the National Board of Health, by E. W. Bowditch and E. S. Philbrick, C. E.

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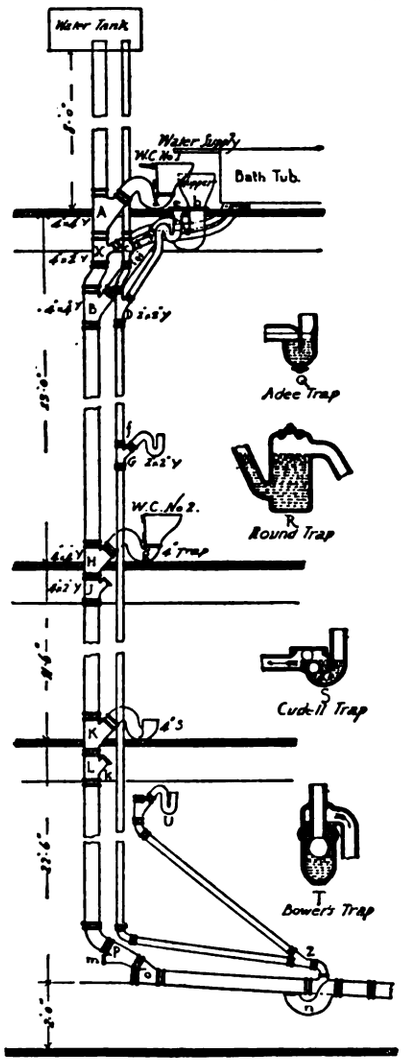
tion in which the water was poured into the hopper. The above records are all the results of pouring it in at the side of the hopper *opposite the trap*, so that the velocity of the water acquired in its fall from the pail through the hopper was not impaired by such an abrupt change of direction when striking the bottom of the trap as it would be if the pail were applied either directly over the trap, or half-way between this and the former position. Moreover there was no strainer at the base of the hopper to break the momentum, the hopper being of the form formerly much used for water-closets.

(8) In order to eliminate in some degree the effect of this momentum the same experiments were tried with another form of hopper, suitable for a water-closet, and having its trap *above* the floor, such as is marked "water-closet No. 1" on the plate. The distance through which the water had to fall from the edge of the hopper to the bottom of the trap was thus reduced by 10″.

The trap had a seal of 2″ and was first tried with no vent in it. It discharged directly into a patent Y-branch with expansion at top, devised for the purpose of preventing siphoning. Nine pailfuls were emptied with a lowering of the trap-water as follows, viz.: 1″, ½″, 1⅛″, 2″, ¼″, 0″, 2⅛″, 1¼″, 2¼″, losing the seal three times in the nine. Another trial under similar conditions showed a loss of the seal three times in five.

(9) A vent-pipe 1′ long and 1½″ in diameter was then applied at the crown of the trap. Ten pailfuls were emptied in a direction to favor a loss of water by momentum, but no appreciable loss of water occurred.

In order to eliminate from the last two experiments the possible effect of the offset in the main pipe directly under the connection of this branch, the same experiment was tried on the floor below, at "water-closet No. 2," with essentially similar results, indicating that the offset did not modify the case perceptibly.

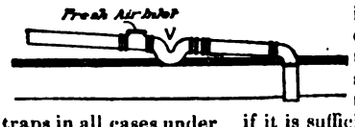


(10) The effect of excessive length of vent-pipes was experimented on with the result that under conditions which indicated perfect security with a pipe 1′ long and 1½″ diameter on a 4″ trap, a coil of pipe 50′ long coupled to the vent rendered it inefficient once in eight trials, the trap having 2″ seal, being siphoned in this case, and lost 1″ of water three other times out of the eight.

In another case where a short vent of 1″ in diameter seemed to be quite efficient, a coil of 1″ pipe with a length of 28′ 6″ being coupled to it rendered the vent of apparently little use, for the trap lost its seal at every trial.

(11) In order to test the effect of a partial closing of the top of the soil-pipe, a piece of paste-board was laid over it having a hole of only 2″ diameter. Such a stricture is often produced above the roofs of buildings in cold climates by the formation of ice through condensation of the vapor of water which rises with the air through the soil-pipes.

It was found that it was much more difficult to retain water in the traps in all cases under this condition except where special vents were applied to the traps themselves. In such cases the stricture above described at the top of the soil-pipe seemed to produce no appreciable effect.



We will next consider the loss of water in traps by the flow past them from above through the main into which they may discharge.

C — EXPERIMENTS WITH A TWO-INCH WASTE-PIPE OPEN AT TOP.

(1) A trap of 1½″ calibre of S-form having 4¼″ depth of seal, and having strips of glass inserted in its sides where the lead was removed, was applied at the branch marked *G* on the plate.

The plug connecting with the 2″ waste was then drawn from the bath-tub on the floor above, and the water allowed to run a few seconds. The water in the trap was found to have fallen 4⅛″. The next trial destroyed the water-seal with a flow of ten seconds. A third trial produced the same result in four seconds.

Five pailfuls of water were then poured in succession into the hopper at *e* on the third floor with this result: —

The seal was twice entirely lost, and for three times the water was lowered 4⅛″, leaving only ⅛″ seal.

(2) This deep trap was then removed and an S-trap of same calibre applied in its place, having only 1½″ seal, with glass strips in its side and a vent-hole 1″ in diameter on its crown. Five pailfuls in succession were poured into the hopper above with no perceptible loss of water in this trap. Its water was agitated less than ⅛″.

(3) The vent-hole was then half covered and the experiment repeated, with scarce a perceptible loss of water.

(4) The vent-hole being wide open the bath-plug was drawn for twenty seconds. The water in the trap oscillated about ½″, but was not lowered perceptibly.

(5) This trap was removed and a Cudell trap substituted, such as is shown at *S* on the plate, with no air-vent in it. The bath plug above was raised for ten seconds, and the trap was found to have lost all its water. The plug was raised again twice for six seconds each time, and the trap twice again completely lost its water seal. Three pailfuls of water were emptied at the hopper in succession and the trap lost its water-seal each time.

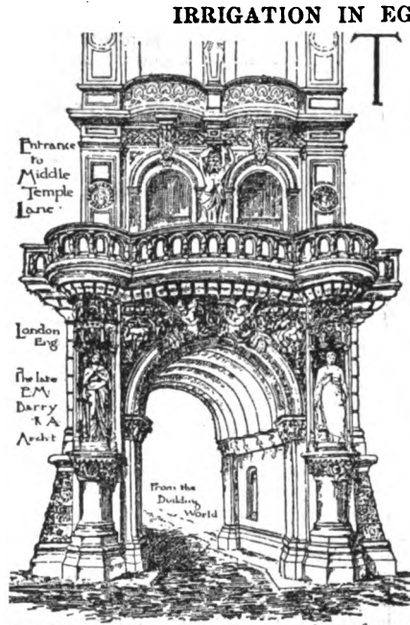
(6) This trap was removed and a Bower's trap substituted, without special air-vent, such as is shown at *T* on the plate. The plug was drawn from the bath above for fifteen seconds, and the trap was found to have lost 1½″ of water, leaving about 3/16″ water-seal. A second and third trial of the same flow without refilling trap left less than 1/16″ seal.

Air was now readily sucked up through the trap by the mouth, in spite of its ball, which was new and clean. On filling the trap again and pouring a pailful into the hopper above ⅜″ seal was left. Two pailfuls more without first refilling trap left about ¼″ seal. The hopper was then filled by a pailful of water and discharged by lifting a plunger, and ⅛″ seal was left.

(7) This trap was replaced by an Adee trap, such as is shown at *Q* on the plate, having 1½″ seal. The flow from the bath above destroyed the seal in ten seconds for three trials in succession. Three successive pailfuls of water emptied at the hopper above left from 1/16″ to ⅛″ seal after each.

Conclusion next week.

IRRIGATION IN EGYPT.



THE American Consul-General at Cairo states that the tillable land of Egypt consists of the delta of the Nile and a narrow valley extending from Cairo, southward. This valley is generally from one to ten miles wide, though for about one hundred and fifty miles above Cairo it has a width of from ten to thirty miles. Both the delta and the valley, except so far as the former borders on the Mediterranean, are bounded on all sides by mountainous deserts, and for more than two thousand miles from its mouth the river has not the smallest tributary. It rolls on towards the sea, unlike other rivers, constantly decreasing in volume. As there are no rains of any practical importance, it sustains all vegetation, and all the inhabitants of Egypt and its herds drink of its waters. For two or three months in the year a considerable portion of the country may be irrigated by the natural rise of the river, but with the exception of certain sections the water is not permitted to flow freely over the land. It is taken from the river and conducted by canals along-side the fields where it is to be used, and spread over the different parcels of land, if it is sufficiently high, and if not it is raised by some of the various modes employed for that purpose. Small embankments prevent the water from running onto other lands that may not at the time be in a condition to receive it; in fact, the process of overflowing the lands, ploughing, sowing, and harvesting are often being carried on simultaneously in adjoining fields. When the land is sufficiently irrigated the water is shut off, or the pumping discontinued. The process of irrigation is required to be repeated several times before the maturity of the crop, the quantity of the water depending very much upon the kind of product. Rice requires a large amount of water, and wheat, rye and oats much less. There are in Egypt 8,406 miles

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of irrigating canals, of which 1,897 are navigable. There are also great dikes along the river and its various delta branches, to prevent their overflow, and innumerable small ditches and embankments everywhere throughout the country. In consequence of the muddiness of the waters of the Nile the canals require frequent cleansing, and the high waters injure the dikes and render it necessary to repair them each year. The greatest amount of labor is, however, that required in raising the water from the river and canals to the level of the lands. Dipping, drawing and pumping are processes going on nearly the whole year, and nearly half of the whole irrigation is done by these means. Its water is raised from one or two feet to twenty, and sometimes more, according to the location of the land and the height of the river. The following is a description of the manner in which water is raised by means of the "shadoof." The "shadoof" is simply a leather basket-shaped bucket attached to a pole, suspended in the same manner as an ordinary well-sweep. The sweep is very short, and the bucket of water is balanced by a mud weight. The instrument is of the rudest character, but by this means water is raised to the height of eight or nine feet with considerable rapidity. If the water is to be raised twenty feet one man close to the river raises it from four or five feet into a basin made of clay in the side of the bank, and from this point two men, each with a bucket, raise it about eight feet to a similar basin, and two other in the same manner to the required height, whence it is conducted by small earth sluices to the required place, often a considerable distance from the river. It requires the constant working of these five "shadoofs" for forty-eight hours to water one "feddan" (equivalent to one acre). This, by changing once in four or six hours, would require ten men, each of whom would apply twenty-four hours' labor to the watering of one acre. This process requires repeating at least three times for each crop. Thus the labor required for the irrigation of one acre would be seven hundred and twenty hours, or seventy-two days of ten hours each. The labor is of the most severe kind, and the fellah, with nothing except a cloth round his loins, is compelled to apply himself to his task with all the energy at his command. In the delta and some parts of Upper Egypt, the water being taken from the river at some distance above the point where it is used, is kept for a considerable portion of the year on very nearly the same level as the land. If, however, it has to be raised at all, it requires at least fifteen days to the acre. When the water is raised only a few feet, the more ordinary method is that of the "sakia," a rude machine propelled by oxen, cows, and horses, and sometimes camels and donkeys, and which raises the water by means of earthen jars attached to an endless rope-chain passing over a vertical wheel. There are a few steam-pumps, but fuel is too expensive and labor too cheap to permit of their general use. The number employed is about four hundred, and these are mostly in Lower Egypt. They are used principally on large estates, but in some cases by those who irrigate the lands of the small farmers, at a fixed price per acre. This is generally where cotton is produced, which requires watering once in eight or ten days throughout the season. The water has ordinarily to be raised but a few feet, and the quantity required each time, when the watering is so frequent, is much less. The usual price paid per acre is about 30*s*, and it is only the low price of farm labor that renders it practicable to cultivate lands requiring so much irrigation. — *Journal of the Society of Arts.*

MONTHLY CHRONICLE.

AUGUST 3. The Central R. R. freight-house at Albany, N. Y., 200′ x 400′, gives way and becomes a total wreck. No one injured.

August 7. A severe earthquake visits the Island of Chios.

August 10. Dam at Calais, Me., carried away, causing much damage to property below it.

August 11. Burning of St. Sauveur, a suburb of Quebec, Canada.

A large land-slide caused by a water-spout near Lenior, N. C., carries away many houses.

August 12. Burning of Randolph County Court-House at Huntsville, Mo., causing the loss of a great part of the city and county records.

Two men killed by touching electric-light wires while climbing the fence of the Tuileries gardens at Paris

August 13. Burning of the lunatic asylum at Lancaster, Pa. No lives lost.

August 14. Unveiling of the statue of Arnold of Brescia, at Brescia.

August 15. A heavy wind-storm visits Bangor, Me, doing much damage to buildings.

Also heavy storms at Madison, Wis., Sterling, Kans., and Sherbrooke, Can

August 20. A serious break in the New York end of the Hudson River Tunnel declares itself.

August 22. Fall of the roof of John Dawson's dye-house, 508 Tenth Ave., New York.

A water-spout bursts over Brünn, the capital of Moravia, doing incalculable damage.

August 23 A water-spout breaks over Dayton, O., and does serious damage to roads and railroads.

August 24. Explosion in, and burning of, the Erie Elevator at Buffalo, N Y. Five lives lost.

August 28. A hail-storm near Pesth destroys vineyards and maize-fields and partly demolishes fifty houses. Many workmen killed.

August 30. Fall of iron bridge on the Canada Pacific R R over the North River, carrying a freight train with it. No lives lost.

August 31 Death, at Berlin, of Johann Halbig, a noted sculpter, at the age of 68.

Burning of the Brunswick Hotel and Pleasant House at Old Orchard Beach, Me. The guests escape uninjured.

A CASE OF PLAN-STEALING.

August 29, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — I have a case as follows: A committe from a School Board from an adjoining city came to my office, selected a design from my files for a school-house, directed me to arrange it to suit a lot that would be filled five feet, and requested me to appoint a time to meet with them. I did so: at that meeting no action was taken except to ask me to leave my designs with them. At a subsequent meeting three members out of six had employed a carpenter to make copies of my work, have advertised for bids and let the contract on the copied work.

I notice you publish law decisions of interest to architects very frequently and wish to ask: Are there any decisions bearing on the question — Is an architect entitled to pay for his work when plans are so appropriated? — if so, will you please send me a copy or reference to them so that I can obtain them? I have the complete files of the *American Architect,* — Has any such decision ever been published in them? This piracy has been practised on me so frequently, and this being an important building, the case an aggravated one on account of the vote standing three to three for several meetings, and finally carried by the three-to-two vote on the absence of one member, and much personality among the members, that I wish to test the case whether I am entitled to compensation for my work under the circumstances, and consequently ask the information above.

I shall be glad to give you full particulars of all the circumstances more fully stated than above and the decision of the question by the courts if you desire for the benefit of others when a decision is reached. Will you please give me such information as you can of any decision bearing on the question?

Respectfully yours, *

[OUR correspondent's letter reads as if his observation of facts might perhaps have been somewhat hasty. Is he sure that his plans were copied by the direction of the committee to whom they were intrusted? May not the carpenter's plans be only similar to his, but not identical? The whole point of the case lies in this. If he can prove that the committee, or any members of it, procured the surreptitious copying of his plans, and thus appropriated to themselves, or those for whom they acted, the benefit of them without payment to the owner, he is at liberty to proceed against them exactly as in the case of any other thieves, by criminal as well as civil action if he likes. If, however, as is more probable, the plans made for them are so far different from his as not to be a palpable copy, he would run a serious risk of being unable to convince a jury that they were his property, and would do better to pocket his loss and keep clear of such company in the future. In regard to adjudicated cases of a similar kind we cannot at the moment give him any reference. In civilized communities committeemen of the sort which our correspondent supposes these to be are seldom found outside of jails, and have on that account little opportunity to enter into controversies with architects. This should not, however, prevent him from pursuing his own course as he thinks best. The only precaution which we would suggest to him is the important one of ascertaining whether he must proceed against those who have injured him as individuals, or against the town or community for which they acted as the authorized representatives. This question would have to be answered by a good lawyer, and to such only should he confide his cause. — EDS. AMERICAN ARCHITECT.]

THE ANNUAL CONVENTION, A. I. A.

CINCINNATI, September 2, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — As resident member of the Committee of Arrangements of the Sixteenth Annual Convention of the American Institute of Architects, I would like to ask through the columns of your paper that all Fellows and Associates who intend favoring the convention with papers will as early as possible notify Mr. Bloor or myself of their intention so to do. This matter is important in order that the final programme may appear in due season and in proper shape. Yours truly, CHAS. CRAPSEY.

STRAW LUMBER.

NEW YORK, September 1, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In a recent number of your publication you make mention of straw lumber. I am looking for a substitute for ordinary lumber for a particular purpose. In your article it is stated that the straw lumber is practically water-proof. Can you, and if so, will you inform me of the component parts of the cement used in the manufacture of the lumber? It is important for me to learn this, for if the cement will not stand the action of certain chemicals, the straw lumber would not serve my purpose.

Any information you can give me on the subject will be duly appreciated. Respectfully yours, B. A. MASON.

TROY, N. Y., August 15, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs — Will you please inform me of the address of the parties manufacturing straw lumber, noticed in No. 345, and greatly oblige Yours respectfully, EDWARD W. LOTH.

[If any of our readers know anything of the whereabouts of a straw-lumber factory they will do us a kindness by putting us in a position to answer these and similar inquiries. — EDS. AMERICAN ARCHITECT.]

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BUILDING NEWS.

PITTSBURGH, August 30, 1882.

To the Editors of the American Architect: —

Gentlemen, —Why is our city never noticed under the heading of "Building Intelligence?" C.

[Simply because "C" does not take interest enough in the matter to send us the necessary information. We cannot invent building news. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Nilometer. —The Nilometer used for the purpose of measuring the height of the Nile is situated on the island of Roda, opposite Old Cairo. It consists of a square well or chamber, in the centre of which is a graduated pillar divided into 17 cubits, each about 21 $\frac{7}{8}$ inches long. Owing to the elevation of the bed of the Nile the relative proportion of the rise of water has been altered, and it now passes about 1$\frac{3}{4}$ cubits above the highest part of the column. The state of the stream is proclaimed in the streets of Cairo during the inundation every day by several criers, to each of whom a particular district is allotted. From 24 feet to 26 feet may be taken as the ordinary maximum of the rise at Cairo. — *Iron Age.*

Ebonizing. — How to make woods, such as cherry, mahogany, etc., look like ebony, is often desirable, and a correspondent of the *Hub* gives the following directions: To imitate black ebony, first wet the wood with a solution of logwood and copperas, boiled together and laid on hot. For this purpose two ounces of logwood chips, with one and one-half ounces of copperas, to a quart of water, will be required. When the work has become dry wet the surface again with a mixture of vinegar and steel filings. This mixture may be made by dissolving two ounces of steel filings in one half pint of vinegar. When the work has become dry again sand-paper down until quite smooth. Then oil and fill in with powdered drop-black mixed in the filler. Work to be ebonized should be smooth and free from holes, etc. The work may receive a light coat of quick-drying varnish, and then be rubbed with finely pulverized pumice-stone and linseed oil until very smooth.

Novel Way of clearing a River. — The work of dragging or harrowing St. Helen's Bar, at the mouth of the Columbia River, having been abandoned as practically useless, and the government appropriation not being available for some weeks, so that the government dredge could not be utilized, a new means of deepening the channel was devised and put in operation, concerning the result of which a very favorable report has been received. The theory was that if the sand of which the bar is formed could be kept in suspension by the motion of a steamship's propeller, the current of the river would carry it out to sea. The scheme was considerably ridiculed by most of the river and ocean captains and pilots, but as the sand of the bar is very clean and light, and the current of the river runs two miles per hour at ebb and three at flood tide, Mr. Prescott, Manager of the Oregon Railway and Navigation Company, felt sufficient interest in the experiment to offer the use of the company's steam collier *Walla Walla* in making it. Under supervision of Messrs. Gates and Holland, the mechanical engineers of the Oregon Railway and Navigation Company, the steamer was moored on the bar, bow up stream, the stern at the lower edge of the bar, and loaded so that the keel touched the bottom. In eighteen hours' actual work a channel 1,000 feet long and 100 feet wide was deepened from a maximum of 18 feet to from 22 to 24 feet. The steamer is now completing and straightening the channel on the whole length of the bar, and after finishing at St. Helen's she will be sent to Walker's Island for similar work. Mr. Prescott speaks enthusiastically of the success of the experiment, which he regards as having solved the problem of keeping the river clear of obstructions and at a nominal cost. — *New York Times.*

A Great Limestone Slip. — One of the greatest land-slips on record recently occurred at Crich, in Derbyshire, England, by which some hundreds of thousands of tons of limestone were displaced, without, however, doing any personal injury. The occurrence, it is said, is hailed with delight by the Clay Cross Coal and Iron Co., which for years has been engaged in blasting the stone for use of iron furnaces. The work of the quarrymen and the use of explosives have thus been suddenly rendered unnecessary, and all that is now to be done is to break up the stone and send it away. The hill itself, which has been removed, is one of the most remarkable features of geological formation. It consists of strata of limestone, which by volcanic eruption have been forced up into a dome through overlying strata of an earlier period, and which were originally deposited in a horizontal position. At one point a shaft was sunk in search of lead ore. It was noticed some time since that the quarrying had caused a considerable crack in the cliff extending to a distance of between 100 and 200 yards from the north to the south-west, and the rains in all probability caused the fissure to open so that in some places it was a yard or two wide. The day before the occurrence took place there were strong indications of what was about to happen, and it is owing only to this fortunate circumstance that the few residents were able to escape in time. There was a villa in proximity to the cliff, and while some men were engaged in the house a trembling motion was noticed which caused a speedy retreat. The house then began to slide towards the road, and the effect of the rush was to raise the road up and finally sweep it away. Mr. George Stephenson, the eminent engineer, was the first to attack the cliff many years ago for the limestone, and since then it has been continuously worked for the iron furnaces. Now, however, not only will the company have supplies without being quarried, but they will be able to supply others. The slip, which might have been a most disastrous occurrence, has thus produced the opposite effect, and more desirable work has been done in the course of a few moments than could have been effected in years of quarrying. — *Iron Age.*

The Bayreuth Theatre. — I cannot close my Bayreuth correspondence without a parting reference to the theatre in which these performances are taking place. Of the successful *ensemble* I have already spoken, and it would not be worth while at this distance to compare the merits of the singers who alternate in their *rôles*. But to the theatre itself attention cannot be often enough called, for it is the only existing theatre in which a complete illusion is attained; and if at the present day an architect undertakes to build an opera-house on any old-fashioned system he can only be accused of either great wilfulness or gross ignorance I earnestly hope that if a new opera-house is to be built in New York the Bayreuth model may be taken into consideration. The very entrance puts the spectator in an artistic mood. The whole theatre is one parquet, in the shape of an amphitheatre, each row rising above its predecessor, so that up to the royal boxes in the background one seat is about as good as another. There are no boxes at the sides, their places being taken by simple but handsome columns, between which are the twelve exits by means of which the whole house can be emptied in two minutes. Especially advantageous is the absence of a proscenium box connecting the stage with the auditorium. Its place is taken by an open space between the last columns and the stage, leading down into the mystic abyss in which the invisible orchestra is at work. The effect of this open space is that it makes the stage seem farther removed, while the figures on it are as large as before, and by familiar optical illusion everything, in consequence, seems larger and more distinct, the difference between our ordinary stages and that of the Wagner theatre being similar to that between a photograph and a stereoscopic view. This optical illusion is rendered the more complete by the invisibleness of the musicians and the conductor to the audience, although the conductor is visible, of course, to the vocalists. The sounds rising from the mystic abyss are not localized by the hearer. They seem to come from the stage itself, — to hover about the singers as its fragrance does about a rose, and the music thus gains that exquisite charm which alone belongs to invisible music, as all those know who have ever been waked up in the morning by a serenade. The sounds, too, are somewhat subdued, so that the singers are never "drowned," as so often happens in ordinary theatres. The only disadvantage of the present arrangement is that the brass, being actually placed under the stage, is a little too much subdued, wherefore the stirring fortissimo passages lose some of their accustomed splendor and glory; but this shortcoming can probably be remedied by a somewhat different acoustic arrangement, while retaining all the present advantages. — *Correspondence of the N. Y. Evening Post.*

Fire-proof Cement. —A fire-proof cement is being introduced, made from a material found in the Eifel Mountains. It is alleged by eminent professional men to be the only material known to science which possesses besides its plastic qualities the virtue of being fire-proof. Moistened with water, this cement forms an elastic mass, which can be exposed when dry to great heat without shrinking or showing any cracks. Such a cement should be peculiarly adapted for repairing defective fireplaces, cracks in retorts, etc., as mortar for fire-proof buildings, and for the interior plastering of furnaces. The mode of its preparation is as follows: The cement is to be well mixed in a dry state, a small quantity of water is added and mixed well together. As a mortar it can be used in the ordinary way. In lining furnaces, however, care must be taken to press the cement well into the walls, so as to leave a smooth, even surface, as when dried by the air the cement easily crumbles and will not harden till ignited. Moreover it must not be treated roughly until it has been well burnt. Cracks in furnaces, retorts, etc., should be well cleansed and scraped, and if possible roughed before applying the cement. The parts to be mended should be damped beforehand. An analysis by Dr. Bischof, of Wiesbaden, gives the following results: The cement is a pale gray, gritty substance, consisting of a good deal of fine dust, with angular and round particles of quartz. When mixed with water it is very sticky, compact, and easily moulded. In 100 parts of the material dried at 120 degrees C. there were:

Clay earth	10.18
Silica, chemically combined	11.03
Silica, mechanically mixed (sand)	71.58
Iron oxide	0 41
Lime	0.23
Magnesia	0.17
Potassium	0.99
Loss by heat	3 46
	100.05

As will be seen, the quantity of fusible matter such as iron, etc., is very small indeed, if any. Under the fire treatment the cement showed the following results: After being heated to silver-smelting heat, or about 1,000 degrees C., the cement turned to a gray color, speckled with a few black spots, the fracture being earthy and porous. — *Scientific American.*

Enamelling Water-Pipes. — Two inventors in Bohemia have patented a direct process for enamelling cast-iron pipes, which can be applied to other hollow castings that are made with cores. It consists in simply covering the sand core with the enamel and then pouring in the iron as usual. The heat of the melted iron fuses the enamel, and it attaches itself firmly to the iron, and detaches itself so completely from the sand that the enamel is said to be all that can be desired for water-pipes and other industrial purposes. In casting sinks, basins, urinals, etc., the enamel can be applied to the sand on that side of the mould which is to form the inside of the basin. The composition of the new enamel is kept a secret, but is said to differ from the old form in the simplicity of its preparation and the extraordinary cheapness of the materials used. It is so cheap that it has found extensive use in many branches of industry. In color this new enamel is gray. It will be useful for gas-pipes as well as water-pipes, because it will make the pipes absolutely tight by this glassy lining. It will be no less useful for soil-pipes, which are always liable to corrosion from the gas they contain, and for conveying acid liquors, like mine-water, and in chemical works, for sinks and waste-pipes in chemical laboratories, it should displace lead, glass or terra-cotta. — *Wood and Iron.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

263,305. WEATHER-STRIP. — Wm. H. Blair, Janesville, Wis.

263,317. ROOF-PAINT. — Robert E. Bruce, Lancaster, Pa.

263,323. WATER-FOUNTAIN FOR STOCK. — Evin E. Davis, Tama City, Io.

263,334. LATHE-REST. — Alexander Gordon, Cincinnati, and Jas. W. See, Hamilton, O.

263,354. CONSTRUCTION AND DECORATION OF BUILDINGS. — Henry C. Rew, Chicago, Ill.

263,371. WINDOW-SCREEN. — Horatio O. Whyman, Norfolk, Neb.

263,380. ELECTRIC SAFETY APPARATUS FOR ELEVATORS. — Cyrus W. Baldwin, Chicago, Ill.

263,381. ROOFING-TONGS. — Thomas Babb Beeson, Wilmington, Del.

263,412. METHOD OF ILLUMINATING BASEMENTS. — Peter H. Jackson, San Francisco, Cal.

263,426. SCAFFOLD-TIE. — John T. O'Brien, Philadelphia, Pa.

263,443. HOT-AIR REGISTER BORDER. — Romanzo Trefethen and Jacob M. Willey, Dover, N. H.

263,446. FLUSH-POT FOR KITCHEN SINKS, ETC. — George E. Waring, Jr., Newport, R. I.

263,448. SEWER-INDUCT AND ITS COVER. — John F. Withey, Lynn, Mass.

263,450. FLUSH-CISTERN. — William Wright, Plymouth, County of Devon, England.

263,455. BIT-STOCK. — Charles H. Amidon, Buffalo, N. Y.

263,461. SOIL AND WASTE PIPE. — James Barrett, Boston, Mass.

263,471. WRENCH. — William A. Bradford, Goshen, Ind.

263,494. SOIL OR DRAIN PIPE. — Patrick W. Doherty, Boston, Mass.

263,536. SASH-FASTENER. — Edward Kuhns, Indianapolis, Ind.

263,560. FIRE-ESCAPE LADDER. — Thomas Miller, Jersey City, N. J.

263,570. ELEVATOR FOR BUILDING MATERIAL. — John Otter, Chicago, Ill.

263,578. CARPENTER'S RULE. — Francis J. Power, Boston, Mass.

263,579. LAYING ARTIFICIAL STONE OR CONCRETE PAVEMENTS. — Ernest L. Ransome, San Francisco, Cal.

263,583. METALLIC ROOFING-SHINGLE. — Henry S. Reynolds, Brooklyn, N. Y.

263,592. BATH-TUB. — William W. Rosenfield, New York, N. Y.

263,602. CALIPERS AND DIVIDERS. — Bernard K. Shumway, Chicopee Falls, Mass.

263,603. ELEVATOR. — William H. Skerritt, Jersey City, N. J.

263,619. EAVES-TROUGH HANGER. — William F. Stoetzel, Omaha, Neb.

263,668. PROCESS OF AND APPARATUS FOR PREPARING ROOFING-FELT AND SHEATHING-PAPER. — William H. Stelwagon, Philadelphia, Pa.

10,191-192 (*Reissue*). ELEVATOR. — Geo. C. Tewksbury, Newark, N. J.

SUMMARY OF THE WEEK.

Baltimore.

ADDITIONS TO DWELLINGS. — Messrs. J. A. and W. T. Wilson, architects, have made drawings for additions to the third st'y and a fourth st'y for the dwell. No. 279 North Charles St.; cost, $1,500; Mr. Wm. B. Wilson, owner.

BUILDING PERMITS. — Since our last report twenty-eight permits have been granted, of which the following are the more important: —

S. Frankenstein & Son, two-st'y brick building, McHenry St., between Munroe and Payson Sts.

Jos. Turner, 6 three-st'y brick buildings, Madison Ave., between Laurens and Oliver Sts.

Mrs. C. Hiltz, 2 two-st'y brick buildings, Dallas St., between Thames and Lancaster Sts.

J. C. Schaffer, three or four st'y brick warehouse, n w cor. Lexington St. and Diamond Alley.

Fort Ave., Permanent Building Association, 5 three-st'y brick buildings, n w cor. Hanover St. and Fort Ave.

L. H. Robinson, 12 two-st'y brick buildings, Presstman St., between Mount St. and Bruce Alley.

Jno. H. Farber, four-st'y brick building, North St., between Pleasant and Bath Sts.

W. T. Jordan & Co., two-st'y brick building, 32' x 48', Block St., w of the "Drawbridge."

J. C. Fenhagen, two-st'y brick packing-house, Aliceanna St., between Washington and Chester Sts.

L. M. Carrick, 3 three-st'y brick buildings, Mount St., between Edmondson Ave. and Franklin St.

Chas. Gantz, three-st'y brick building, Chase St., between Greenmount Ave. and McKim St.

A. L. Black, 5 three-st'y brick buildings, Chase St., w of Constitution St.

S. T. Richardson, 8 three-st'y brick buildings, Mount St., commencing at s e cor. of Presstman St.

S. T. Richardson, 6 three-st'y brick buildings, Presstman St., between Mount St. and Vincent Alley.

Henry Westphal, 12 two-st'y brick buildings, Barney St., commencing at s w cor. Byrd St.

S. O. McComas, 6 two-st'y brick buildings, Cole St., commencing at s e cor. Gilmor St.

Fred Kroeber, three-st'y brick building, n w cor. Washington and Bank Sts.

Seth A. Marchand, 4 two-st'y brick buildings, Chester St., between Fayette St. and Fairmount Ave.

Seth A. Marchand, 4 two-st'y brick buildings, Castle St., between Fayette St. and Fairmount Ave.

Boston.

BUILDING PERMITS. — *Newbury St., No.* 280, Ward 11, for Silas W. Merrill, three-st'y dwell., 23'4" x 62'; S. W. Merrill, builder.

Kneeland St., Nos. 169 *and* 173, cor. South St., Nos. 223 and 225, Ward 12, for Patrick Holly, four-st'y dwell., 17' 4" x 37' 6"; Asa Lowe & Co., builders.

Silver St., Nos. 254 *and* 256, Ward 13, for Dudley Pray, one-st'y store and dwell., 21' 6" x 34'; S. H. L. Pierce, builder.

Northampton St., cor. Baldwin St., Ward 18, for Sarah McDonald, two-st'y glass-manufactory, 47' x 51'; Leander Greely, builder.

Parker St., near Boylston St., Ward 22, for Samuel G. Snelling, two-st'y mechanical, 20' x 40'; J. D. Payne, builder.

Wood. — *Elmore St.*, near Mayfair St., Ward 21, for L. L. and G. H. Whitney, two-st'y dwell., 28' x 42'; ell, 18' x 25'; L. L. and G. H. Whitney, builders.

Elmore St., near Mayfair St., Ward 21, for L. L. & G. H. Whitney, two-st'y dwell., 28' x 42'; ell, 18' x 25'; L. L. & G. H. Whitney, builders.

East Seventh St., near M St., Ward 14, for Edmund C. Coleman, one-st'y dwell., 19' x 30'; ell, 12' x 15'; Wm. T. Eaton, builder.

M St., cor. East Seventh St., Ward 14, for Edmund C. Coleman, one-st'y dwell., 21' 3" x 33'; Wm. T. Eaton, builder.

M St., near East Seventh St., Ward 14, for Edmund C. Coleman, one-st'y dwell., 21' 3" x 33'; Wm. T. Eaton, builder.

Brighton Ave., near Allston St., Ward 25, for Chas. A. Sabine, one-st'y stable, 22' x 29'; Chas. A. Sabine, builder.

Garfield Ave., off Carey St., Ward 23, for Chas. B. Botsford, one-st'y stable, 28' x 28'.

Allston Sq., near Allston St., Ward 25, for M. T. Sprague, one-st'y stable, 28' x 28'; M. T. Sprague, builder.

Hulbert St., near Regent St., Ward 21, for John Guirney, two-st'y dwell., 25' 2" x 38' 2".

Quincy St., near Columbia St., Ward 24, for City of Boston, one-st'y primary school, 33' 2" x 65' 8"; John B. Wilson, builder.

Pynchon St., opposite Cedar St., Ward 21, for J. P. Thorndike, one-st'y iron foundry, 60' x 140'; Clark & Lee, builders.

Brooklyn.

BUILDING PERMITS. — *Vanderbilt Ave.*, e s, 20' s Bergen St., 4 three-st'y brownstone flats; cost, each, $5,500; owner, architect and builder, John V. Porter, 184 Park Pl.

Myrtle Ave., s s, 20' e Throop Ave., 6 three-st'y brick flats; cost, each, $6,000; owner, D. R. James, Myrtle Ave.; architect and carpenter, R. C. Addy; mason, not selected.

Oakland St., e s, 130' n Calyer St., three-st'y frame tenement; cost, $2,500; owner, Bart. Conley, 269 West Twenty-second St., New York; architect, F. Weber; builder, not selected.

Beaver St., e s, opposite Park St., 4 two-st'y frame dwells.; cost, each, $2,300; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, Th. Engelhardt.

Marcy Ave., s e cor. Walabout St., 3 three-st'y frame tenements; cost, each, $4,000; owners, Moller & Schumann, Marcy Ave., cor. Flushing Ave.; architect, J. Platte; builders, H. Grasman and John Rueger.

Pierrepont St., s s, 175' e Henry St., four-st'y brownstone dwell.; cost, $60,000; owner, A. D. Farmer, 63 and 65 Beekman St., New York; architect, Wm. Baker; masons, E. D. Connolly & Son; carpenter, not selected.

Willoughby Ave., n s, 100' w Marcy Ave., 2 three-st'y brownstone dwells.; cost, $8,000 each; owner and carpenter, Samuel Peden, Jr., 399 Marcy Ave.; mason, J. Softy.

Flushing Ave., s s, 200' e Marcy Ave., one-st'y brick warehouse; cost, $3,000; owners and builders, Chas. Phizer & Co., 11 Bartlett St.; architect, M. J. Morrill.

Seventh Ave., n w cor. Eighteenth St., 4 three-st'y frame tenements; cost, each, $2,400; owner and carpenter, Frederick Schroedef, 386 Seventeenth St.; architect, W. H. Wirth; mason, C. Lauenstein.

Forrest St., n s, 16' n w Flushing Ave., 2 three-st'y frame tenements; cost, $6,500; owner, Her. Gerdes, 1231 Flushing Ave.; architect, Geo. Hillenbrand; builders, J. Schloeb and J. Weidner.

Greene Ave., No. 259, n s, 300' e Grand Ave., two-st'y brick shop; cost, $5,000; owner, architect and builder, J. N. Smith, 371 Lafayette Ave.

Norman Ave, No. 114, s s, 25' e Eckford St., three-st'y frame tenement; cost, $4,500; owner, Boesche Rebers, on premises; architect, Th. Engelnardt; builder, Ch. Antonius.

Clason Ave., No. 100, w s, 275' s Flushing Ave., three-st'y frame tenement; cost, $4,500; owner, Margaret Downey, on premises; architect, Th. Engelhardt; builder, J. G. Hoepfer.

St. Mark's Pl., No. 751, two-st'y brick coach-house; cost, $6,000; owner, James Haslehurst, on premises; architects, Wm. Field & Son; builders, Jas. Ashfield & Son and T. A. Remsen.

King St., No. 111, being 125' n w Richards St., three-st'y brick tenement; cost, $4,200; owner, Chas. Smith, on premises; architect, G. Damen; builders, Peter Kelly & Sons.

Thirteenth St., n s, 60' e Fourth Ave., 2 two-st'y brick dwells.; cost, each, $3,000; owner and architect, T. Pitbladdo, 213 Seventeenth St.; builders, W. & T. Corrigan.

Graham Ave., w s, 100' s Grand St., three-st'y frame tenement; cost, $3,600; owner, Daniel Canty, 532 Grand St.; architect, G. Hillenbrand; builder, U. Maurer.

Lafayette Ave., Nos. 1118-1122, s s, 110' e Broadway, 3 two-st'y frame dwells.; total cost, $7,500; owners, Isaac Debevoise and H. Stocks, 1437 Broadway; builder, H. Stocks.

Willoughby Ave., s s, about 190' e Throop Ave., three-st'y and basement brick dwell.; cost, $14,000; owner, James Richmond; architect, Henry F. Kilburn; builders, John Clark and P. F. O'Brien.

Palmetto St., n s, 230' w Myrtle Ave., three-st'y frame store and tenement; cost, $5,000; owner, Hen. Steinmann, cor. Fifth and North Ninth Sts.; architect, Geo. Hillenbrand; builders, G. Welsch and John Rueger.

Fulton St., s s, 285' e Rochester Ave., 3 three-st'y frame stores and dwells.; cost, $2,500 each; owner, Alex. C. Hanner; architect, T. F. Thomas; builders, Lax & Co. and —— Nichols.

ALTERATIONS. — *Myrtle Ave., No.* 341, raised 2'; also one-st'y brick extension; also store front strengthened; cost, $2,700; owner, H. W. Rozell, 383 Myrtle Ave.; builders, W. Bulkley and Long & Barnes.

Prospect Pl., late Warren St., n s, 58' 7" w Brooklyn Ave., two-st'y brick extension, interior alterations etc.; cost, $6,000; owner, Chas. S. Emery, St. Mark's Pl., n e cor. Brooklyn Ave.; architects, Wm. Field & Son; builders, Jas. Ashfield & Son and Powderly & Murphy.

Henry St., No. 327, e s, 100' s Atlantic Ave., three-st'y brick extension, front and interior altered; cost, $2,950; owner, Mr. Ludrich, on premises; builders, M. Gibbons & Son.

De Kalb Ave., Nos. 617 *and* 619, add one-st'y flat; also three-st'y frame extension; cost, $3,000; owner, P. M. Dale, 60 South Elliott Pl.; builder, W. J. Heligan.

Chicago.

HOUSE. — W. Loomis is about to build a house on Dearborn Ave. It is to be of brownstone, with pressed brick finish; it will cost $20,000; Cobb & Frost, architects.

CHURCH. — The English Lutheran Congregation is about to build a Gothic church, on the cor. of Elm St. and La Salle Ave., from plans by C. O. Hansen; it is to cost $30,000.

STORE. — F. Wasco is building store and flat on cor. Division St. and Ashland Ave., from plans by J. J. Flanders; cost, $5,000.

BUILDING PERMITS. — Wm. Kemper, two-st'y brick dwell., 24' x 40', Kemper St., near Orchard St.; cost, $3,500.

J. Pojder, two-st'y and basement brick store and dwell., 24' x 106', 608 Throop St.; cost, $9,000.

C. Swensen, two-st'y and basement brick store and dwell., 22' x 46', 200 Townsend St.; cost, $4,000.

Thomas Seeger, three-st'y and basement brick store and dwell., 25' x 75', 244 Indiana St.; cost, $7,000.

R. Kalock, two-st'y and basement brick dwell., 20' x 50', 21 McReynolds St.; cost, $4,100.

J. Hacknle, two-st'y and basement brick store and dwell., 24' x 60', 711 Twenty-first St.; cost, $4,000.

John H. Drury, three-st'y and basement brick store and dwell., 25' x 47', 269 West Madison St.; cost, $7,000.

F. Walther, three-st'y brick dwell., 22' x 52', 358 North Halsted St.; cost, $4,500.

Frank Charwach, two-st'y brick dwell., 21' x 46', 490 Twentieth St.; cost, $2,700.

D. W. Walker, 5 three-st'y and basement brick dwells., 67' x 98', 1800 to 1808 Indiana Ave.; cost, $15,000.

D. W. Walker, four-st'y brick dwell., 56' x 66', 63 to 65 Eighteenth St.; cost, $10,000.

R. D. Sheppard, five-st'y and basement brick store, 50' x 73', 199 and 201 Fifth Ave.; cost, $30,000.

Potter Palmer, two-st'y brick store, 23' x 70', 12 Quincy St.; cost, $2,500.

Potter Palmer, two-st'y brick store, 23' x 70', 19 Quincy St.; cost, $2,500.

John Hamlen, two-st'y and basement brick dwell., 22' x 60', 557 Twenty-sixth St.; cost, $4,500.

T. O'Shea, two-st'y brick dwell., 22' x 57', 74 Kossuth St.; cost, $3,500.

Frank Rocco, three-st'y and basement brick dwell., 25' x 60', 95 Astor St.; cost, $10,000.

Thomas Chocola, two-st'y and basement brick dwell. and store, 23' x 77', 538 Centre Ave.; cost, $4,000.

A. Lane, two-st'y and basement brick dwell., 22' x 66', 133 North Market St.; cost, $4,000.

John Meister, two-st'y brick dwell., 21' x 56', 313 Eighteenth St.; cost, $3,000.

A. Connors, two-st'y and basement brick dwell., 22' x 50', 330 Centre Ave.; cost, $4,000.

Jacob A. Rothschild, three-st'y and basement brick dwell., 36' x 70', 2633 Michigan Ave.; cost, $18,000.

A. Seedenspiuner, two-st'y brick dwell., 21' x 40', 580 Larrabee St.; cost, $2,600.

Peter Schillo, two-st'y and basement brick dwell., 24' x 50', 100 Johnson St.; cost, $6,000.

Freeman Campbell, 6 two-st'y brick dwells., 36' x 120', De Kalb St., near Leavitt St.; cost, $20,000.

M. Schraeder, two-st'y brick flat, 21' x 56', 408 Garfield Ave.; cost, $4,000.

J. E. Fowler, two-st'y brick dwell., 21' x 50', 623 South Ashland Ave.; cost, $2,600.

Wm. Emery, four-st'y and basement brick store, 50' x 95', 75 and 77 Ohio St.; cost, $15,000.

Paul Muehlmann, three-st'y and basement brick store and flats, 24' x 60', 3502 State St.; cost, $8,000.

F. Sefel, three-st'y and basement brick flats, 22' x 56', Franklin St., near Elm St.; cost, $6,000.

North Chicago City Railway Co., two-st'y brick car-house, Larrabee St., near Centre St.; cost, $10,000.

F. Kleinhaus, three-st'y and basement brick store and flats, 25' x 60', 853 Clark St.; cost, $11,000.

Wm. Gerts, two-st'y and basement brick dwell., 21' x 48', 670 Twentieth St.; cost, $4,000.

S. G. Williams, two-st'y and basement brick dwell., 24' x 40', 239 South Lincoln St.; cost, $4,500.

C. G. Meyer, two-st'y brick store and dwell., 24' x 50', 94 Clybourn Ave.; cost, $3,500.

Cincinnati.

LABOR MARKET. — Small demand at present for free-stone workers; other branches are reasonably busy.

BUILDING PROSPECTS. — The *Gazette* says that the prospects are, should the rain now keep off, that the fall building trade will be livelier than it has been for several seasons. The builders and con-

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tractors are just returning from their holidays and are getting out their orders. Most of the jobs that were set back by the strikes of the workmen in the spring have been put on the order-book again, and many people who hesitated to make contracts owing to the disturbed and upward tendency in rates have made up their minds that it is no use expecting lower figures, and have given out their work. The increase in the cost of lumber, brick and other material is from 5 to 25 per cent over last year. Most of the workmen in the several branches also receive an advance of 25 cents per day. It is worthy of note that the smooth compressed New York brick is coming much in vogue for "facing" of buildings of the better class. The workmen who superintend the laying of this kind of brick have to be experts, and as the number is limited and they work by the piece, they make big wages — all the way from $5 to $7 a day.

CORRECTION. — The types made it appear that the contract for the limestone for the new union depot was let to H. Meiners & Son for $4,300, which was all right except that the amount should have been $43,000.

BUILDING PERMITS. — George Tait, two-st'y frame dwell., Grove St., between Plum and Elm Sts.; cost, $3,500.

Wm. Miller, two-st'y brick dwell., Ohio Ave., near Parker St.; cost, $6,600.

H Shillerin, three-st'y brick dwell., Vine St., near Mulberry St.; cost, $2,000.

Wm. Baker, four-st'y brick dwell., cor. of Kenny and Denman Sts.; cost, $7,000.

R. T. Morris, three-st'y brick printing-house, No. 65 Vine St.; cost, $5,000.

John Brie, three-st'y brick dwell., Hopkins St., near Dalton Ave.; cost, $4,600.

Lape Bros., to rebuild portion of planing-mill recently destroyed by fire, cor. of Laurel St. and Central Ave.; cost, $5,000.

Six permits for repairs; cost, $2,500.

Total permits to date, 540.

Total cost to date, $1,524,000.

New York.

BUILDING PERMITS. — *Third Ave.*, w s, 150' n Harlem River, extending to s w cor. Third Ave. and One Hundred and Thirty-fourth St., five-st'y brick machine-shop, one-st'y brick foundry, and one-st'y brick engine-house; cost, $30,000; owner, J. L. Mott Iron Works, Mott Haven, N. Y.; architects, Babcock & McAvoy; builders, J. & W. C. Spears and T. Overington.

One Hundred and Twenty-second St., s s, 225' w Pleasant Ave., 2 four-st'y brownstone apartment-houses; cost, each, $9,000; owner, Mrs. Margaret Schmitt, 432 East One Hundred and Twentieth St.; architect, George M. Walgrove; builder, Frank Schmitt.

Lexington Ave., s e cor. Seventy-ninth St., 5 three-st'y brownstone dwells.; owner, Hiram Sigler, Jersey City; architect, R. W. Buckley.

Eighty-fifth St., s s, 100' w Third Ave., 2 five-st'y brick tenements; cost, each, $16,000; owner, Bernard Havanagh, 185 East Sixty-fourth St.; architect, J. Hoffmann.

First Ave., e s, about 100' n One Hundred and Twenty-fifth St., one-st'y brick boiler-house and office; cost, $3,000; owner, Geo. T. Gaden, 15 West One Hundred and Twenty-fifth St.; architect and builder, Geo. Damen.

Ninth Ave., No. 763, four-st'y brick dwell.; cost, $13,000; owner, Elizabeth Phillips, 765 Ninth Ave.; architect, Wm. Jose; builders, M. Lapp and H. Weiler.

East Eighty-fourth St., No. 321, four-st'y brownstone flat; cost, $16,000; owner, Thomas Bennett, 345 East Eighty-fifth St.; architect, R. W. Buckley.

Ninth Ave., e s, 25' n One Hundred and Twenty-fifth St., 5 four-st'y brick tenements; cost, each, $12,500; owner and architect, S. M. Styles, 143 West One Hundred and Thirtieth St.

Tinton Ave., w s, 100' s Cedar St., 3 two-st'y frame dwells.; cost, each, $3,000; owner, C. Decker, 811 Forrest Ave.; architect, W. W. Gardiner; builder, P. P. Decker.

Lexington Ave., n e cor. One Hundred and Eighth St., 14 four-st'y brownstone tenements; cost, each, $16,000; owner Jacob Jenny, 149 East One Hundred and Tenth St.; architect, Chas. Baxter.

One Hundred and Ninth St., n s, 245' w Third Ave., four-st'y brownstone apartment-house; cost, $14,000; owner, Margaret Schmitt, 432 East One Hundred and Twentieth St.; architect, J. F. Burrows.

Eighty-seventh St., n s, 80' w First Ave., four-st'y brownstone tenement; cost, $9,000; owner, Peter J. Uihlein, 1710 First Ave.; architect, Julius Kastner.

Eighty-first St., s s, 200' e Tenth Ave., 4 three-st'y brick and terra-cotta dwells.; cost, each, $11,000; owner, Mrs. Annie E. Brown, 1280 Broadway; architects, D. & J. Jardine; builders, Sinclair & Wills and J. Jennings.

South St., No. 380, running through to and being No. 324 Front St., three-st'y brick factory; cost, $30,000; owner, R. G. Mitchell, 8 West Nineteenth St.; builder, John C. Wessells.

Greene St., No. 113, five-st'y brick warehouse; cost, $32,000; owner Lippman Toplitz, 47 East Sixty-eighth St.; architect, Henry Fernbach.

ALTERATIONS. — *One Hundred and Forty-eighth St.*, s s, 30' e Morris Ave., raised one st'y; also three-st'y frame extension; cost, $4,000; owner, Robert Huson, 218 East Fifteenth St.; architect, J. W. Marshall; mason, R. Huson; carpenter, not selected.

Beaver St., Nos. 14 *and* 16, extending to Marketfield St., add one st'y, rebuild west side wall, elevators, etc.; cost, $25,000; owner, W. H. Caswell, exr., 87 Front St.; builders, J. M. Dodd, Jr., and L. H. Williams.

East Sixty-eighth St., No. 60, at s w cor. Fourth Ave., three-st'y brick extension; cost, $10,000; owner, Emily Fowler, on premises; architects, D. & J. Jardine; builders, J. & G. Ruddell.

West Fourteenth St., No. 405, two-st'y brick extensions; cost, $2,500; owner and builder, Philip Herrmann, 405 and 407 West St.

Sullivan St., No. 23, rebuild all unsafe walls, front alterations, etc.; cost, $4,000; owner, Mary G. Finkelmeier; builder, S. H. Mapes.

Front St., No. 93, first and second stories altered for offices, new windows and chimneys; cost, about $5,000; owner, Geo. W. Lane, on premises; architect, R. M. Upjohn; builders, Burns & McCann and Perkins & Green.

West Fifty-fifth St., No. 71, two-st'y and basement extension; cost, $5,000; owner, Wm. M. Reynolds, 152 West Fifty-seventh St.; architect, R. Rosenstock.

Philadelphia.

BUILDING PERMITS. — *Orleans St.*, s e cor. Emerald St., 10 two-st'y dwells., 14' x 40'; J. Cunningham.

Salmon St., n e cor. Lehigh Ave., three-st'y dwell., 20' x 48'; C. Fay, contractor.

Edom St., n s, e of Kennedy St., one-st'y factory, 55' x 175'; A. B. Rorke, contractor.

Germantown Ave., cor. Wayne Junction, three-st'y carpet factory, 40' x 112'; A. B. Rorke, contractor.

Tackawana St., cor. Gillingham St., three-st'y umbrella factory, 123' x 202'; Aaron P. Bilyeu, contractor.

Division St., n s, w of Jefferson St., 4 two-st'y dwells., 16' x 30'; Peter Collins, owner.

Evergreen Ave., s s, bet. Twenty-fourth and Twenty-fifth Sts., three-st'y dwell., 18' x 28'; George S. Roth, contractor.

Muscher St., s w cor. Putnam St., three-st'y factory, 54' x 67'; David Mayhew, contractor.

Hope St., w s, n of Columbia Ave., No. 1718, three-st'y dwell., 18' x 28'; Anthony Laird, owner.

Ridge Ave., e s, n of Kitchen St., three-st'y dwell., 18' x 40'; Edward C. Parker, owner.

Rittenhouse St., n s, bet. Main and Green Sts., three-st'y dwell., 18' x 30'; John Breidling, contractor.

S. Eighteenth St., No. 1432, two-st'y dwell., 16' x 43'; J. H. Young & Bros., owners.

Eighteenth St., n e cor. Pennsylvania Ave., one-st'y machine shop, 31' x 100'; Baldwin Locomotive Works, owner.

Leiper St., w s, n of Allen St., three-st'y dwell., 28' x 43'; Wendell & Smith, contractors.

Cemetery Lane, cor. Frankford Road, three-st'y store and dwell., 18' x 69'; Shegog & Quigley, contractors.

Eighteenth St., cor. Fisher's Lane, two-st'y factory and engine-house, 45' x 72'; John G. Schuler.

Alder St., w s, n of Norris St., 2 two-st'y dwells., 14' x 28'; Michael Smith, owner.

St. Louis.

BUILDING PERMITS. — Eighty-five permits have been issued since our last report, of which twenty-two are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Carondelet Union Hall Association, two-st'y store; cost, $5,000.

James Gunn, 3 two-st'y dwells.; cost, $9,000; T. J. Gunn, contractor.

Samuel R. Hamilton, two-st'y tenement; cost, $3,500; T. Moore, contractor.

T. McGrade, two-st'y dwell; cost, $3,500; T. Brady, architect; Hugh Reymond, contractor.

Mrs. Agnes Elliott, two-st'y dwell.; cost, $7,500; S. H. Hoffmann, contractor.

Grand Avenue Presbyterian Church, church; cost, $36,000; F. D. Lee, architect; Samuel Ross, contractor.

St. Louis Mutual House Building Company, No. 3, two-st'y dwell.; cost, $4,171; Beckmeier & Riethmann, contractors.

A. H. Handlan, 3 three-st'y dwells.; cost, $15,000; James A. Conlan, contractor.

J. Buchka, two-st'y store and dwell.; cost, $4,500; Louis Strecker, contractor.

Mrs. F. P. Corby, two-st'y dwell.; cost, $3,000; Barnes & Morrison, contractors.

Bolman & O'Hara, two-st'y warehouse; cost, $4,000; T. Gugerty, contractor.

D. C. Schwelkhardt, two-st'y dwell; cost, $3,500; T. Gugerty, contractor.

J. P. Fairley, 2 two-st'y dwells.; cost, each, $6,000; T. Brady, architect; H. Redmond, contractor.

Kansas Bucket Manufacturing Company, four-st'y factory; cost, $7,000; J. B. Legg, architect; A. E. Coko, contractor.

General Notes.

GREENFIELD, MASS.—Alterations and additions are to be made to the house of Mr. G. C. Gardiner, from designs of Messrs. Wilson Bros. of N. Y., architects.

HAVERHILL, MASS.—Mr. E. A. P. Newcomb, of Boston, is the architect of the new church and chapel now being built for the First Baptist Society. It will be of brick with terra-cotta finish, is in the Romanesque style, and will measure 85' x 175', with seating capacity in the church for 1,200 and in the chapel for 600; Messrs. Gidding Bros. of Exeter, N. H., are the contractors.

SAN ANTONIO, TEX.—A house, stable, farmer's cottage and other buildings are to be built on the estate of Mr. J. W. Brackenridge; from designs of Mr. Chas. I. Berg, of N. Y.

WAYLAND, MASS.—A frame house, 41' x 63', two stories is now being built for Mr. C. A. Cudding; Hartwell & Richardson, of Boston, architects.

Industrial.

BROCKTON, MASS. — A four-st'y addition, 100', is to be added to C. H. Ward's shoe factory.

CLAREMONT, N. H. — The Monadnock Mill Company will soon build a cotton mill.

CLEVELAND, O. — The Globe Iron Works will build an addition, 101' x 120'.

The Northern Ohio Blanket Mills will build a new mill, 50' x 160'.

DETROIT, MICH. — The Detroit Emery Wheel Company are about to enlarge their mills to double their present capacity.

EPPING, N. H. — A new shoe-factory is to be built in place of the one belonging to B. W. Hoyt, which was burned there some time ago. A stock company has been organized, to be known as the B. W. Hoyt Manufacturing Co., who will commence the building at once.

Bids and Contracts.

BOSTON, MASS. — The contract for building a new dining-hall for the South Boston Lunatic Asylum has been awarded to P. J. McGonigle & Co. The bid was $8,690.

PROPOSALS.

PLASTERING. [At Philadelphia, Pa.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., September 1, 1882.

Sealed proposals will be received at this office until 12 M., on the 21st day of September, 1882, for all the plastering required in the Court-House and Post-Office at Philadelphia, Pa., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAMES G. HILL,
351 Supervising Architect.

JETTIES. [At Volusia Bar, Fla., and Brunswick Bay, Ga.]

UNITED STATES ENGINEER OFFICE, ARMY BUILDING, NEW YORK, August 25, 1882.

Sealed proposals, in triplicate, addressed to the undersigned, will be received at this office until 12 o'clock, noon, on the 25th day of September, 1882, at which time and place they will be opened in the presence of bidders, for constructing jetties at Volusia Bar, Fla.; constructing jetty and dredging in Brunswick Harbor, Ga.; and for dredging in Wappoo Cut, S. C.

Proposals for each work must be separately rendered and properly endorsed on the envelope. Specifications, instructions to bidders, and blanks for proposals may be obtained at this office or from Capt. B. D. Greene, Corps of Engineers, Charleston, S. C.

Q. A. GILLMORE, Lt.-Col. Engineers.
351 Bvt. Maj.-Gen., U. S. A.

JETTIES AND TIMBER DIKES. [Cheesequakes Creek, N. J.]

U S. ENGINEER OFFICE, ROOM 59, ARMY BUILDING, COR. HOUSTON AND GREENE STS., NEW YORK, August 18, 1882.

Sealed proposals, in duplicate, will be received at this office until 12 o'clock, M., of Friday, September 22, 1882, for improving Cheesequakes Creek, by the construction of rubble jetties and timber dikes and by dredging.

Amount available, $35,000.

For forms of proposals and all information apply at this office.

G. L. GILLESPIE, Maj. of Engineers.
351 Bvt. Lt.-Col., U. S. A.

BRICKS. [At Cincinnati, O.]

The Cincinnati Gas-Light and Coke Company will receive tenders up to noon Saturday, October 14, 1882, for five million bricks, to be delivered at "East End Garden," situated between Eastern Avenue and Ohio River, and Main and Spencer Streets, First Ward, Cincinnati.

One million to be delivered between January 1 and March 1, 1883.

Two million to be delivered between March 1 and May 1, 1883.

Two Million to be delivered between May 1 and July 1, 1883.

Each bid to be accompanied by specimens of the bricks to be furnished, which specimens are to be made the standard to which deliveries must conform, in accordance with the provisions of the specifications on file at Gas office, corner Fourth and Plum Streets.

A good and sufficient bond in the sum of $10,000 will be required, conditioned upon the faithful performance of the contracts.

Bids will be received for the whole lot, and also for separate deliveries.

The Company reserves the right to reject any and all bids. 354

RIP-RAP GRANITE.

UNITED STATES ENGINEER OFFICE, NEW LONDON, CT., August 28, 1882.

Sealed proposals in triplicate will be received at this office until 11 o'clock, A. M., on the 27th day of September, 1882, for rip-rap granite to be delivered in Breakwater at —

Stonington Harbor, Ct.
Clinton Harbor, Ct.
New Haven Harbor, Ct.
Port Jefferson Harbor, N. Y.
Greenport Harbor, N. Y.

Specifications and blank forms for proposals and for guaranty will be sent on application to this office.

J. W. BARLOW,
351 Major of Engineers, U. S. A.

SCHOOL-HOUSE. [At Brown, O.]

Sealed proposals will be received at the office of the Clerk of Board of Education, in Brown township, Franklin County, Ohio, until Saturday, September 16, 1882, at 12 o'clock, noon, for furnishing materials and doing the following work, to wit:

For building a new school-house, 24' x 30', 12-foot story, of brick, in sub-district No. 7 (seven), Brown township.

Plans and specifications can be seen at the office of said Clerk.

The different materials and the labor must be separately stated in the bid, with the price thereof.

Each bid must contain the name of every person interested in the same, and shall be accompanied by a sufficient guaranty of some disinterested person, that if the bid be accepted a contract will be entered into and the performance of it properly secured.

The Board reserves the right to reject any or all bids at discretion. JOHN T. HURD,
350 Township Clerk.

POLICE-STATION. [At New York, N. Y.]

Sealed proposals will be received at Police Headquarters until September 13, 1882, for building a station-house, lodging-house, and prison on the ground and premises now occupied by a building known as Franklin Market. For full particulars see *City Record*; copies for sale at No. 2 City Hall. 350

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 351.

SEPTEMBER 16, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE government of the Massachusetts Institute of Technology has made arrangements for a regular and thorough course of instruction in electrical engineering, including the theoretical studies in mathematics, chemistry and physics necessary to equip the student for original investigation, as well as practical training in all the modern applications of electricity. So far as we know, this is the first recognition on the part of a school of science of the great work which waits to be done in that important field, and practical electricians will be quick to appreciate the value of the opportunity which it offers for enlarging the views, and promoting the success, of those who will follow them in the exploration of the domain of electrical knowledge. How little is already known in comparison with what remains to be learned is every day more evident, and wonderful as are the telegraph, the telephone and the electric-light, experience only serves to convince us of their present imperfection. To take a single example of the problems which remain to be solved in telephony alone, it is a matter of daily experience to those who use that instrument that the signals rapidly lose their distinctness as the distance to which they are sent increases; and conversation is in practice rarely possible in the daytime between stations more than twenty or thirty miles apart. At night, however, the confusion of noises which prevents long-distance conversation is hushed, and perfect signals are received over lines two or three hundred miles long. The explanation of this is found in the induction which one electric current exerts upon all others near it, and which the sensitiveness of the telephone instruments renders peculiarly troublesome. If two telephone wires are suspended in the air twenty feet apart, a conversation transmitted over either line will be distinctly heard on the other; and telegraph or electric-light wires exercise a much stronger influence. Even the cut ends of the wires at the splicings of a telephone line are said to act as small transmitters, and to receive and forward the natural sounds which may be produced around them, such as the singing of birds or the croaking of frogs, so that a conversation over a wire of considerable length has, as it were, to run the gauntlet among the scraps of talk imparted from neighboring lines, the crackling and hammering due to induction from telegraph and electric-light wires, and the vague murmur compounded of an infinite number of lesser disturbances; and it is not surprising that it is soon overwhelmed by so many adverse influences. The obvious remedy for these inconveniences would consist in the employment of a wire so insulated as to be proof against all induction from without, but no method of securing such insulation has yet been devised. The problem must be solved sooner or later, for all material advance in telephony depends upon its solution. With a wire protected from induction the multiplication of the present telephone system a hundred-fold would be a question of a few months, and it is not too much to say that the discoverer of a method of effectual insulation will reap a reward greater even than that of the inventor of the telephone itself.

THE managers of the Lynn Steam Heating Company, some of whose pipes recently exploded under the street, have adopted a singular theory of the cause of the catastrophe. Although threatened with a total loss of their business through the action of the city officials, who notified them to remove their pipes from the streets forthwith, they seem to have taken no pains to ascertain and remedy the defects which led to the failure, but contented themselves for some weeks with vague excuses. Now, however, they have aroused themselves sufficiently to announce the offer of a reward of one thousand dollars for the detection and conviction "of the person or persons who caused the explosion." They profess, moreover, to have learned of the existence of a conspiracy to injure their prospects by means of explosions in their pipes, to be brought about by some secret means, and say that a fortunate accident only prevented a second catastrophe more serious than the first. The nature of the devices by which the pipes were to be surreptitiously destroyed is not explained, although the suggestion is made that the result was to be accomplished by introducing "cold water" into them. This surmise resembles a theory advanced just after the explosion, that the "rising of the tide" into the pipes caused their destruction, and of the two the latter seems decidedly the more probable. We do not see just how the hypothesis of a conspiracy improves the position of the company in relation to the public. If anything, a corporation unfortunate enough to be pursued by such reckless malice is a worse neighbor than one which merely employs careless and ignorant servants, and it seems more prudent than ever to insist on the removal of the pipes.

ANOTHER failure of underground steam-pipes took place last week, this time in New York, where a considerable number of very large pipes have been laid through various streets in the lower part of the city. One of these, in Broadway, not far from Wall Street, which had only been laid about a month, gave way in the night, apparently under a very slight pressure, so that the roadway was not torn up, and no inconvenience resulted to the passers-by further than the necessity of encountering clouds of vapor, which filled the street. Probably a defective joint was the source of the trouble, but it is not pleasant to think of the consequences of a more serious explosion in lower Broadway by daylight.

THE committee having in charge the matter of the equestrian statue of Paul Revere, to be erected in Boston, have not shown, if we may trust the report of the daily papers, that exceptional comprehension of the best mode of obtaining a design which we had hoped for from them. The cost of the monument is estimated at twenty thousand dollars, and according to the *Transcript* the committee has voted to invite artists to submit models in competition for this important work, on the condition that the authors of the three best designs shall receive equal premiums of two hundred and fifty dollars each. As it is not yet too late to modify these terms we trust that the committee will not be offended at our saying that not a single first-rate, or even second-rate design will be received in answer to such an invitation. Even if such sculptors as Mr. St. Gaudens, Mr. Olin Warner, and one or two others, would enter into a competition on any terms, neither they nor any others of reputation would give a moment's thought to a trial of skill in which the honor and profit of the execution of the statue, at a fair compensation, was not unreservedly promised to the one who should be awarded the highest place, not by the suffrages of a jury of amateurs, but by experts, whose judgment would command the respect of the whole artistic world. With this essential condition secured, the offer of supplementary premiums might as well be dispensed with. No one who knew anything of the difficulties of the sculptor's art would dream of undertaking the long and arduous study necessary for producing even a small model of an equestrian statue for the trifling sum of two hundred and fifty dollars, and there is no advantage in offering temptations to tyros who have no conception of what sculpture means. If the committee, or the subscribers to the statue, wish to obtain for their money a work of art which shall cast honor upon them and their city, there is one, and only one, way of doing so,—that is, to secure a good artist to design and execute it; and the only way of securing the services of a good artist in these days is to pay for them. It is true that by

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a skilful appeal to the feeling of emulation, which is so strong among artists, it may be possible to engage several in a contest for a single prize; but such emulation must be excited by the prospect of high and public honor, not only to the winner, but to the other contestants, and without this it is worse than useless to propose competitions.

The unfortunate inhabitants of Newark and Jersey City, who are compelled to drink the water of the Passaic River, have now the prospect of finding a new and most unpleasant ingredient added to the mixture which flows in the channel of that stream. A few days ago, persons living on the upper waters of the Passaic, near the mouth of a small tributary called Saddle River, noticed considerable quantities of oil floating on the water. The official inspector of the Jersey City and Newark Water Boards was notified, and found on investigation that a stream of coal oil was flowing into Saddle River at a little distance from its mouth, sufficiently copious to cover the water in some places to a depth of four inches. The oil made its appearance at the intersection of the course of the river with the pipe-line of the Standard Oil Company, and was found to issue from a break in the pipe about a mile and a half from the river, making its way thence through the loose earth around the pipe. About two thousand barrels of oil were found to have escaped, most of which was floating slowly down the current. At the latest advices the oil had reached the Newark pumping station, and its taste was plainly perceptible in the water delivered in the city, but the inconvenience of this was somewhat overshadowed by the fears of the inhabitants lest the oil should take fire as it passed by. The quantity is large enough to cause a great and uncontrollable conflagration if accident or malice should kindle it, and even the people of New York, twelve miles away, are not without anxiety as to the result.

We publish with pleasure in another place the announcement of an exhibition and fair which is to be held in the Rotunda of the Capitol at Washington, under the auspices of the Society of the Army of the Cumberland, in aid of the project for erecting a monument in Washington to the memory of President Garfield. The exhibition will occupy several adjoining rooms as well as the Rotunda, and is intended to comprise works of art, specimens of ladies' fancy-work, and manufactures of many kinds. It is hoped that contributions will be made by artists and amateurs throughout the country of articles to be sold for the benefit of the monument fund, and there seems to be every reason for believing that an ample response will be given to the invitation. The occasion is a particularly memorable one, and the regard of the country for the martyred President, which has as yet lost nothing of its warmth, will eagerly embrace the opportunity which the fair will give for expressing itself in kind action.

A new elevator has just been patented which is likely to prove the first of a series of similar ones, as it presents certain elements of safety which are wanting in those of the ordinary kind. The essential peculiarity of the new elevator is that the car or platform carries its hoisting machinery with it, in the shape of a small electric motor placed on top of the car, and arranged to drive two vertical endless screws at the diagonal corners of the platform, which are geared into ratchets, or rather sections of corresponding hollow screws, secured to the posts which form the guides. The current is conveyed to the motor by a flexible insulated wire, which coils and uncoils on the top of the car as it ascends or descends. The great advantage which a screw elevator presents over all other kinds lies in the impossibility of its becoming detached from its supports. Even the breaking of several teeth of the ratchet will not release the screw, and nothing short of the complete disconnection of this from the frame of the car will allow the load to descend. The old-fashioned Tufts elevators secured this result by impaling, so to speak, the car upon an enormous screw, extending the whole height of the shaft, and driven by an engine at the foot; but the apparatus in the middle of the car was inconvenient, and as there was no other simple mode of operating a screw attached to the moving car from a stationary engine, the dangerous rope elevators soon had the field to themselves, with the exception of the direct-acting hydraulic elevators, and Miller's hoist, in which screws on top of the car, working in ratchets attached to the guide-posts, were moved by means of a belt extending the whole height of the shaft. Both of these present some inconveniences, particularly with lofty hoists, but the transmission of electric force through flexible wires has solved the problem, as it will many others.

A case of some importance to mill managers was recently decided by the full bench of the Supreme Court of Massachusetts on appeal from the decision of a single justice. It seems that a certain woollen mill in Plymouth changed owners about two years ago, and the new proprietors placed a large steel bell on the mill, which they caused to be rung at five o'clock on the morning of every working day in winter, and again at various hours during the day. Two persons who occupied houses near the mill, one three hundred feet and the other a thousand feet away, complained that the ringing disturbed the quiet and comfort of their homes, and represented that the bell was unnecessarily large, that it was of no use for any purpose of trade or manufacture, and that it was rung at unreasonable hours and unnecessarily long. The mill proprietors replied that it was necessary to employ some means for calling the operatives to their work, and that the bell was of suitable size, and was rung at suitable hours for the purpose, and in a proper manner. The plaintiffs applied for an injunction to prevent the ringing of the bell, and the two questions presented to the court were, whether it was proved that the ringing was a nuisance to the plaintiffs, and whether it was such a nuisance that the court should interfere to prevent it by injunction. Both these questions were answered in the affirmative, and such bells in Massachusetts must henceforth be rung in a different manner, or not at all.

Within a year or two an important modification has taken place in the views of certain French experts in regard to the proper mode of lighting school-rooms. Every architect knows that for the last ten years the invariable rule for school buildings on the Continent, followed also very generally in England and the United States, has been to restrict the windows of the rooms to one side, and to seat the pupils so that the light should fall upon their desks only from the left; this being supposed to be less fatiguing to the eyes than the illumination resulting from the admission of light from two sides; and the planning of school-rooms with windows arranged so as to give cross-lights has been generally regarded as conclusive evidence that the designer was ignorant of the first elements of school architecture. In 1879 or 1880, however, Dr. Javal, the Director of the Ophthalmological Laboratory of the Sorbonne, undertook a protracted inquiry, the results of which were embodied in a report made to the Biological Society, on Myopia in Schools. A considerable portion of the report was devoted to the question of the proper orientation and lighting of school-rooms, and he was led to prefer, for all school-rooms of greater width than thirteen feet, a plan by which light was admitted from two sides instead of one. In rooms of greater width than this, when lighted only from the left, the illumination of the most remote desks was at times inadequate for clear and comfortable vision, and of all the schools examined those which showed the greatest proportion of short-sighted pupils were some of recent construction where the accepted theory of fenestration had been most rigorously carried out. On the other hand, the statistics obtained did not indicate that any injurious effect of this kind was produced upon the eyes by cross-lighting, provided that the illumination was ample, and that the windows were situated at either side of, or behind the pupils, but not in front of them; and the school most free from myopic pupils was one in which the rooms were furnished with large windows in two sides.

Another careful trial of the new process of blasting in coal mines by means of quicklime was made the other day in what is known as the Silkstone colliery in England. A hole three inches in diameter and four feet deep was drilled in a solid mass of coal, and after clearing out, a perforated iron tube was first inserted, and then a charge of compressed quicklime, formed into a cartridge about three inches long. After forcing the cartridge into place and tamping the hole, water was pumped into the tube, and the coal immediately began to give way; and in thirty minutes a mass weighing about ten tons separated almost unbroken. The waste in dust and small coal was only six per cent, a much smaller proportion than is usual where powder is used for extraction, and the new process seems likely to become popular.

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THE SIPHONAGE AND VENTILATION OF TRAPS.[1]—II.

D—EXPERIMENTS WITH THE FOUR-INCH WASTE OR SOIL PIPE OPEN AT THE TOP.

THE four-inch trap at *g* on the plate, having two inches depth of seal, was observed. The vent-hole in the trap was at first closed.

The discharge of a pailful of water at the hopper above lowered the trap-water $\frac{7}{16}$″.

The simultaneous discharge of the hopper and water-closet above lowered the trap-water $2\frac{3}{16}$″, destroying the seal.

The discharge of the hopper while the bath-waste was flowing lowered the trap-water $2\frac{1}{16}$″ and broke the seal.

The discharge of the water-closet above six times in succession lowered the trap-water respectively $1\frac{1}{16}$″, $1\frac{1}{8}$″, $\frac{1}{2}$″, $1\frac{1}{4}$″, $\frac{7}{8}$″, and $1\frac{1}{2}$″. The discharge of the water-closet, hopper, and bath together, six times in succession, lowered the trap-water from $2\frac{5}{16}$″ to $2\frac{1}{2}$″, destroying the seal every time.

(2) The vent-hole $1\frac{1}{2}$″ in diameter in this trap was then opened. The water-closet, hopper and bath were then discharged simultaneously ten times in succession, with the loss of only $\frac{1}{8}$″ of water from the trap in any instance.

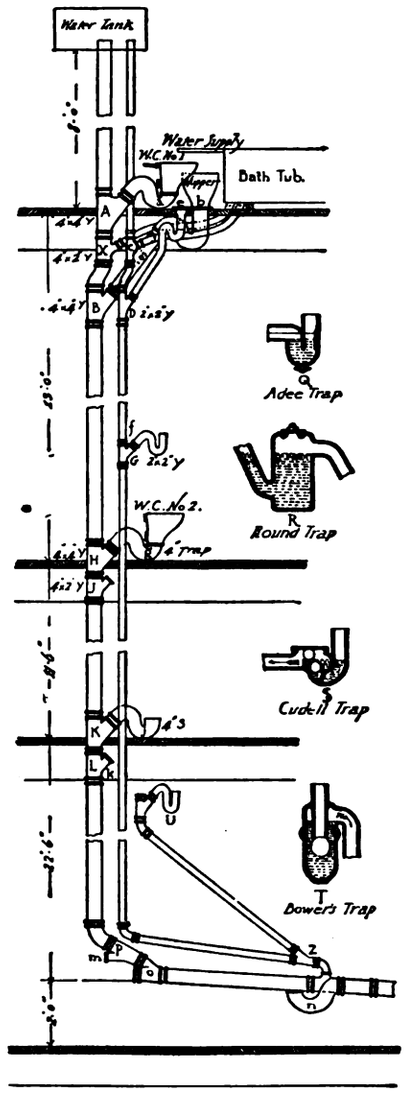
(3) This same experiment was twice repeated with the top of the soil-pipe closed, showing a loss of only $\frac{3}{8}$″ of water from the trap in any case.

(4) The water in the large trap at *j* on the plate was observed with discharges of water from above similar to those noted in the last three experiments and with results so essentially similar that they are hardly worth reciting in detail.

(5) An S-trap of $1\frac{1}{2}$″ calibre and $1\frac{1}{2}$″ depth of seal was attached to the branch marked *J* on the plate, on the second floor, with no vent in the trap. Water was discharged ten times in succession from the bath and water-closet above for periods of five to eight seconds each. The trap was unsealed four times and lost from $\frac{5}{8}$″ to $1\frac{1}{8}$″ of water at the other six trials.

(6) The same experiment was repeated with an opening in the crown of the trap $1\frac{1}{8}$″ diameter, with loss of the trap-water as follows: $\frac{1}{4}$″, few drops, $\frac{1}{8}$″, $\frac{3}{16}$″ twice, few drops twice, $\frac{1}{16}$″ twice, few drops.

(7) A Bower's trap was attached at the same place, with no air-vent in it. The water-closet above was discharged while the bath-waste was running ten times successively. The trap lost its water-seal four times and lost at the other six trials from $\frac{1}{4}$″ to $1\frac{1}{4}$″ of water.



(8) A Cudell trap was then substituted, at the same branch, marked *J*. The water-closet was discharged above, while the bath-waste was flowing, ten times in succession. Nine times the water was all taken out of the trap, and once there was about $\frac{1}{8}$″ left.

(9) A round trap, having $2\frac{1}{2}$″ seal, as shown at *R*, was then substituted at this branch *J*. The discharge of water-closet No. 1 lowered its water $\frac{1}{8}$″. The discharge of same closet and the hopper together lowered it $\frac{3}{4}$″. Further trials of this trap showed that the discharge of the largest volumes of water possible at once from the three fixtures above could not unseal it, for though quantities of air were drawn through it, as seen through the glass in its sides, there was so much space for the air to pass by the water that the seal always remained efficient. It would be instructive to try such a trap after it had been encumbered with grease and other rubbish, as is often the case, and when this space for air to pass by the water might perhaps not be found.

Before deducing any rules for practice from these experiments it must be remembered that they were made with new, clean, enamelled pipes, while those in ordinary use are always more or less encumbered with scales and tubercles of rust and with the grease and slimy coating deposited by the sewage. Even in vertical pipes such collections often reduce the diameter $\frac{1}{4}$ of an inch, thereby reducing the sectional area of a 4″ pipe about $12\frac{1}{2}$ per cent, and of a 2″ pipe about 23 per cent: while in sloping waste-pipes, like those under wash-trays and bath-tubs, the accumulation of solid matter from the sewage often amounts to a permanent occupation of one-half or three-fourths of the whole section.

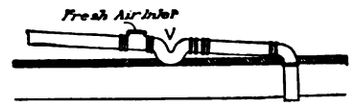
It needs but a casual reference to the above experiments to prove, what is generally known and admitted already, that the difficulty of retaining water in traps increases as the size of the waste-pipe decreases, so that we must expect with pipes that have been used for any considerable period much more tendency in the traps to lose their seal by unequal air-pressure than in the cases recorded above under conditions which are otherwise similar. Two causes combine to produce this result, viz.: The smaller pipe is filled by a less volume of water, which acts like a piston as it passes downward, while the air that follows from the vents above finds in the smaller pipes less room to flow in, and a consequent increase of friction, which, by impairing its velocity, leaves the unequal pressure that we complain of.

Moreover, there are various conditions affecting the stability of water in traps which may not have been foreseen and covered in these experiments. The various results actually arising, when repeating the same experiment under conditions apparently identical, show how unsafe it is to make general deductions from a small number of trials. These variations may be accounted for in part by the various paths taken by the water when poured at different times from one vessel to another, and when running down a vertical pipe. There is always a tendency to follow a spiral course. When such a twist is given to the water at the start, in the hopper, it generally checks the velocity so as to prevent the unsealing of the trap attached to it. When occurring in the vertical pipe, as it passes by the connections of other branches, it makes a great difference whether the path of the spiral happens to hit exactly across the opening of such a branch, or happens to pass on the other side of the main.

It would require much more time and labor than we have spent upon the subject to exhaust any considerable part of such possible variations which are likely to occur in daily practice. The relative size and position of the different branches, the quantities of water passing through them, and the endless number of combinations of flow from different fixtures, which occur daily in any large house or hotel, all tend to vary the result to a degree which should induce a prudent man to allow a large margin on the side of safety. The risks are known to be considerable in case of exposure of untrapped drains in dwellings.

It should also be remembered in this connection that we live in a climate where artificial heating of houses, warm chimneys, and the careful closing of wall and window cracks, combine to produce a decided pressure of air from without the house inward, acting through all our house-drains through several successive months every year, and that we know of no method, as yet, so satisfactory for resisting this pressure as the use of water-sealed traps. We are aware that a large number of ingenious devices have been introduced to supplement the water-seal by mechanical valves with moving cups, balls and flaps, but we have never seen one of these devices which could be relied upon to shut out air after the apparatus had been used and defiled for a few months by a flow of ordinary house-drainage, whether from laundry, kitchen or lavatory.

CONCLUSIONS AND RECOMMENDATIONS.



E.—When hopper water-closets are used for the emptying of slops, and when the trap is placed below the floor, it is difficult to preserve the seal in the ordinary form of S-trap, even by a vent-pipe attached thereto, unless this be applied directly at the crown of the trap and be as large as four inches in diameter for at least a foot above the trap. The momentum of the falling water helps the air-draught to do the mischief. An abrupt change of direction may impair this momentum; but since it is manifestly useless to try to control the direction in which the water is emptied into the hopper, we should endeavor to check it by the form of the apparatus. We

[1] A Report to the National Board of Health, by E. W. Bowditch and E. S. Philbrick, C. E.

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must assume that the water will generally be emptied in the most convenient manner, and this is quite as likely to favor the loss of the trap-water by momentum as otherwise, unless the form of the fixture controls it. An increase of the depth of the seal and a decided, quick upward turn at the bottom of the trap will both operate in this direction. But there are limits to the advisable depth of water-seal, arising from the tendency of deep traps to retain their filth. Moreover all angles, and very abrupt changes approaching the form of an angle, should be avoided for the same reason. The proper medium is only to be attained by the use of good judgment in any case.

F. — When a short hopper is used for emptying slops, with a trap above the floor, though the momentum of the falling water is considerably reduced by the diminished distance through which the water falls from the pail to the trap, there is still no security for keeping the water in such a trap, unless supplied by a special air-vent. This should be at least 1½ inches in diameter if more than a few feet in length, and even larger if passing to other floors above.

G. — Other forms of traps which, like the one referred to in experiment D (9), might save and retain their water by means of a lateral expansion of their basins are objectionable, owing to the amount of filth they retain, subject to decomposition. The ordinary S-trap alone, with ample air-vent, is therefore recommended for use under water-closets, and also for all other fixtures where its proper ventilation can be secured within reasonable limits of expense. The proper size and length of such vent-pipes must be largely a matter of judgment, and will be referred to again. Their combinations admit of such a great diversity of conditions that we can only urge that every one should be severely tested by repeated trials, applying larger vents, or making the small sizes shorter whenever any doubt arises as to their efficiency.

H. — The above precautions are of more importance, and should be observed with greater care when waste-pipes are used of smaller size than four inches to carry the flow for more than one or two feet in distance. The difficulties arising in such cases are illustrated by the experiments A and C, above noted.

I. — Whenever branch inlets are connected to a line of waste or soil pipe that is vertical or approaching that direction, above which branches other fixtures are used for discharging water into the same main, there is great risk of losing the water from the traps attached to such branches whenever the upper fixtures are used. No form of trap without special air-vent has come to our notice which is not likely to lose its water-seal under such circumstances, even when the top of the soil or waste pipe is open, except those which, like the round trap above referred to, are objectionable for retaining filth. This form of trap shown at *R*, on the plate, is largely used about Boston for the reason that its seal is difficult to be broken, The objection above alluded to is intended to be met by providing a large capped opening at the top for the removal of filth. In practice this is seldom done, and if done without the help of a mechanic the cover would rarely be closed tightly, as now constructed, so that the frequent cleaning of such traps is very difficult to accomplish and an annoyance when done. The risk involved by the use of such small cesspools in the house would be small if perfect tightness could always be insured at the joint of the cover. Air-vents are sometimes applied to them, but are of doubtful utility. Experts differ in opinion, according to their individual experience, as to their liability to become choked with filth in their upper part. The writer has seen them so far encumbered with grease, etc., as to lose most of those advantages in ability to retain their water-seal. We can, therefore, recommend with less reservation the use of a well-ventilated S-trap wherever the vent-pipe can be applied without unreasonable cost. The round trap may often be properly used, however, in old houses, in places where the introduction of a vent might be very inconvenient or costly.

J. — The best and most simple remedy for the siphoning of traps, in most cases, is undoubtably to be found in the introduction of air at the normal pressure at the crown of the trap. The reason for preferring the crown to any other place can be found in the above record. [See experiments B (2), (3), (4), (5), (6), (7).]

No definite rules can be given for the size or length of vent-pipes: see paragraph C, above. Yet it may be said that it is not safe to trust to a vent-pipe of less size than that of the trap it is to serve until we get above two inches diameter, except they be of only a few feet in length, before they join those of a larger size. The greater efficacy of a vent applied directly at the trap, as compared with the air-supply through the top of the main soil-pipe, is shown by experiments B (11), and D (2) and (3).

K. — There is still another risk arising from change of air-pressure in drains besides that of siphoning traps. The latter is the result of lack of pressure, while an excess of pressure is also to be avoided. The following experiment may illustrate this point. It is applicable to all house-drains having an exterior main trap, or discharging into a cesspool at a point below the water-line by a dipping inlet pipe, as is often done for the sake of checking the back flow of gas from the cesspool.

(1) The trap at the lower end of the system, at the point marked *V* on the plate, was filled with water, and the air inlet just above it was capped. The trap at (*n*) on the basement floor was then filled with water and a pailful emptied at the hopper on the third floor, connecting with the 4″ main. The air was so compressed ahead of the falling water that it was forcibly blown out at the trap (*n*), carrying with it a good deal of water, showing how foul air from a drain can thus be ejected into the apartments of a house in considerable volumes. The fixture connected with such a trap may generally be able to collect and restore to the trap enough of the water expelled to save its seal, and thus no apparent defect would be found unless the blowing out of the foul air through the trap happened to attract attention.

(2) On removing the cap from the air-hole near *V* and repeating the experiment, no apparent disturbance followed in the trap (*n*).

(3) Another experiment was tried to illustrate the retarding effect of friction and consequent change of pressure in small waste-pipes as follows: An ordinary S-trap of 1½″ and seal 1½″ calibre was attached in the basement to the branch marked U of the 2″ waste-pipe. This represents a combination frequently occurring in the waste-pipes of pantry-sinks. This trap was filled with water, and a pailful emptied into the 2″ waste on the third floor above. The air was forcibly blown out of the trap at *V* by the compression of the air ahead of the descending charge, even when the 4″ air-hole near *V* was open in the main below. This result was plainly due to the friction caused by the air rushing through the abrupt bend at the connection marked Z. It shows the risk incurred by branching small waste-pipes into one another when used on several floors, and the impropriety of using a quarter-bend and T-branch at Z instead of a Y-branch.

Though condemned by most English authorities it is doubtless a safer way to connect the waste-pipes of baths, bowls, etc., used on upper floors directly to the large soil-pipe by Y-branches as near as practicable to the fixtures drained, than to erect long lines of smaller sized wastes separately for such purposes. Certainly the larger the pipe, the less is the risk of any abnormal air-pressure occurring by its use, so long as the wastes are not likely to become encumbered seriously by accretion of solid matter. The provision of separate wastes for baths, etc., all the way to the basement is considered important in England, probably because of a dislike to make inlets in the soil-pipe used for water-closets; but the risks arising from the use of a small-sized waste through such distances are thus proved to be considerable and should not be ignored: while those arising from the common use of a 4″ or 5″ pipe for water-closet and general refuse water on several floors may have been over-rated in England.

Edward S. Philbrick,
Ernest W. Bowditch.

Boston, Mass., June 12, 1882.

MUNICIPAL ABUSES IN BALTIMORE.

THIS city is one of the best examples of the condition to which all American cities will be sooner or later reduced by the unrestricted use of overhead electric wires. There are two rival electric-lighting companies, one of which has contracted for lighting a large part of the business district, and has planted great numbers of huge wooden posts about 18 feet high, upon which their lights are supported. Both of these companies have erected their poles wherever they saw fit, and together with the telephone, district and regular telegraph, and the fire-alarm systems, have succeeded in disfiguring all our streets to the last degree. American cities generally are famous for utter neglect of effect, in the arrangement of their streets and of the buildings upon them, but nothing tends more to mar the little good we have than this subversion of the public comfort to private greed. There can never be any true advance in art until the public voice demands that our streets shall be utterly freed from the detestable poles and wires which now everywhere obstruct them. The streets of this city have been for more than a year at the mercy of any corporation which chose to destroy them.

We have been subjected to a war of rival gas-companies, which rode rough-shod over our liberties and tore up our streets in every direction. This has at last ceased, leaving many a sunken furrow to mark the imperfect filling of the trenches, when lo! another company, owning two lines of pipe, proceeds to mine for its hidden but unavailable wealth on Charles Street, the chief retail thoroughfare of the city, and once more are we subjected to upturned pavements and the smell of filthy earth, saturated by exposure for years to leaking gas-pipes. Now comes the edict that the cobble-stones of 1776 shall be replaced by "Belgian blocks," *at the expense of the owners of property bordering on the street to be repaved*, instead of being paid for out of the general tax-levy, raised from the public, who are

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mainly benefitted. The streets are therefore again subjected to the attacks of an army of Hibernians, this time, we trust, to leave them better and not worse than they found them. Howard Street has been repaved for a dozen blocks when some individual, discovering that a private sewer, leading directly through the newly paved street, would be to his advantage, forthwith tears up the work at will, and marks the track of his ill-advised efforts by the long-drawn furrow which Baltimoreans have learned to know so well. This lack of foresight is further shown whenever one of the typical "rows" of houses is constructed, and the footway smoothly paved, as though no such conveniences as gas and water existed. This lasts for perhaps a week, when the upheaval occurs, and the neatly paved walk is scattered to the winds, that pipes may be carried to each house, and the cross-furrow, fatal to axles and comfort alike, be produced.

Another upheaval, through which we are now passing, is caused by the new horse-railway tracks. The last State Legislature reduced all fares to five cents for adults, and strange to say, several new companies were at once formed. The first horse-car was run on our streets in 1859. The companies now have 151 miles of track, and employ 1352 men, 2,830 horses, and 304 cars. One of the new lines has been brought to a sudden check by the tracks of two of our principal steam-railroad lines, which it has essayed to cross at grade. In the argument asking for an injunction it was stated, by counsel for the steam roads, that several hundred crossings by engines were made at the disputed point daily, and he very pertinently remarked that in case of collision the locomotive would not be the sufferer. The day has undoubtedly passed for grade-crossings of steam railroads. Edmondson Avenue, now being completed in the county, the property-owners along its city line, desirous of finishing it by connecting with the county extension, caused the grade to be established crossing the Baltimore and Potomac Railroad by a bridge. This required heavy filling in a small portion of the avenue, and called forth an appeal for a grade-crossing from two owners who fancied themselves greatly damaged. It was discovered, however, that one of the appellants nearly lost his life, only escaping with a demolished carriage and a broken leg, at a grade-crossing recently, and the other was actually deriving a revenue by allowing his low land to be used as a dump for surplus earth. The decision was unanimously against them.

Quite a remarkable squabble is at present going on, regarding the location of a monument to General Armistead, the defender of Fort McHenry during the bombardment of 1814. The city appropriated $1,500 for the work, and it has been completed by a stone-cutter unknown to fame. The committee having charge of the matter selected Eutaw Place as the site, and were about to lay the foundation when a remonstrance, numerously signed by residents of the aforesaid "Place," was presented to the Mayor. The reasons given are: That they do not want a grave-yard made of the locality, and that the effect of the marble would be out of keeping with the shrubbery and flowers, and the contrast "glaring." This from people who see little else during their waking hours beside the reddest of brick and the whitest of marble, in the miles of dwellings surrounding that neighborhood, is a little too much. One gentleman said he had secured $2,000 toward the erection of a bronze equestrian statue of Colonel John Eager Howard, to stand on the spot selected for the Armistead monument, and to cost entire, $10,000. In reply, the chairman of the Armistead committee very pertinently remarked, that "the sum named would hardly procure anything of a higher order of merit than a wooden Indian before a tobacconist's shop!" Both sides talk of placing the matter before the courts: so the end is not yet.

CIVIS.

MORE ABOUT THE BOOLAK MUSEUM.

LITTLE did we suspect when some few weeks since we spoke of the scheme which had been determined on to explore the Delta of the Nile,[1] that the march of political events would render any such undertaking impossible, perhaps for many years to come; and now it seems that it is not alone the further researches of the archæologist that will by recent events be arrested. The collections of a generation of diligent antiquaries are threatened, if not with absolute destruction, with the scarcely better fate of dispersion. The announcement has gone the round of the artistic world that it is the intention of Arabi Pasha to dispose of the Boolak Museum. Stories have reached us of the courageous conduct of the director, M. Maspero (who succeeded, it will be remembered, the late lamented Mariette Bey), who, in the midst of the utmost danger, has, captain-like refused to abandon his ship. All who are aware of the exceptional value of the contents of the museum must have trembled to hear of the imminent danger which the collected treasures of twenty years' toil are at present running. Coupled with the threatened fate of that storehouse of Arabic art, the city of Cairo, the dispersion of the Boolak Museum, which has revealed so many secrets of the unknown past, adds only a further horror to the many that have accompanied the recent outbreaks in Egypt. Should such a thing occur at Cairo nothing can replace its treasures of architecture and decorative art, as delicate as any that flourished contemporaneously with our exquisite Gothic. Some knowledge of the pecuniary value of the contents of the Boolak Museum promises, it would appear, to prove the safety of the collection, and in this hope we must thankfully trust.

The story of the formation of the Boolak Museum affords in itself a not unrepresentative chapter of modern Egyptian history; the indifference and apathy with which the collection has at all times been regarded by the natives, by the late Khedive Ismail Pasha himself — without whose aid, however, it is frankly admitted the museum could never have been formed — are only too characteristic of the nation among which the late lamented Mariette Bey passed so many years of his life in the organization of the museum which remains a monument that will do more to honor his memory than even the costly statue, which, within a few days past, has been unveiled in his native town of Boulogne. The museum, installed in a series of warehouses, is far from being lodged in a suitable manner. Ismail Pasha had, it would appear, originally intended that it should be sumptuously housed, and many thousands of francs — bondholders' francs, we suppose — were expended some years ago in the erection of a house for the museum; a mass of ruined walls, lying on the road from Cairo to the Pyramids, is the sole result of this expenditure. In its present quarters the museum is, it appears, in dangerous proximity to the Nile, and had not recent changes been made with a view to raising the floor-level, the annual inundations of the Nile could not have failed in time to have seriously injured the collection. As it is, the objects are much affected by the prevailing dampness. There seems, however, a certain fitness in the situation of the museum, the Nile floating majestically by, as it has done century after century, with its river life the same that the Egyptians of the days of the Pharaohs and the Israelites saw. Those who have visited the spot all agree in speaking in unmeasured terms of the beauty of the situation of the museum, pleasantly removed from the bustle, the noise, and the luxury of Cairo, to the city of the Thousand-and-One Nights.

It is the especial feature of the Boolak Museum that it differs materially in its character from every other museum of Egyptian antiquities. It is a museum organized specially with a view to aid the study of Egyptology.[2] The mode in which the collection was formed gives it this special character. Apart from a small gathering purchased by Said Pasha, it is entirely the result of the excavations conducted during twenty years past under the direction of the late Mariette Bey. The European museums, as every one knows, have mostly been formed in a far from consecutive manner. The Boolak Museum, on the other hand, is the result of a series of researches made on a regularly organized plan, directed by one man, and that man Mariette Bey. Of each period of history the museum contains all the information which research has been able to gather. In his invaluable catalogue Mariette Bey has shown how the greater part of the European museums have been formed by the purchase of collections gathered largely without any coherence. No idea can be formed, he urges, of the Egyptian excavations, if it be imagined that their sole result has been the collections that form the pride of the European museums. For every relic there exhibited, twenty others have been left behind as imperfect or too difficult to move. At Boolak, on the contrary, all the fragments found have been specially studied, and, however mutilated, are regarded as worthy of being placed in the museum. The result may be found by the general public to be somewhat solemn and severe, but to the student the collection is invaluable.

Not long since great changes were made in the museum with a view to insuring its greater security from the possibilities of inundation. The interval was taken advantage of to re-arrange many of the objects, in spite of the very restricted and inadequate quarters in which the museum is lodged. With the laudable desire of arousing in the native mind a proper interest in the productions of their ancestors, Mariette Bey arranged his gathering in a popular rather than exactly scientific order, but the changes were taken advantage of to effect a re-arrangement. Great difficulties had to be grappled with in the organization, according to a chronological order; even greater difficulties presented themselves in the way of dividing the collection, as is the case in Paris, and more particularly in Berlin, into separate "civil," "religious," and "funerary" rooms. The largest gallery is filled with thousands of the statuettes, bronze objects, gold and silver vases, and various other relics such as are to be found in every public collection; but, it may be observed, nowhere in such profusion or in such a state of preservation as here. In two other rooms are disposed a series of mummies, scarabæi, amulets, arms, etc., found in the tombs, the *bric-à-brac* of a civilization whose every relic possesses to us its value. The real interest of Boolak is not centered in these objects, specimens of which every museum possesses. The collections of busts and statues is one of the features of the greatest originality.

We possess, it is evident to all students, but very indifferent specimens of the sculptor's art in Egypt. Herodotus and Diodorus Siculus assure us that the Egyptians did not produce their statues as Greek traditions have directed. They divided the figure into twenty-one and a quarter different portions, the execution of which was confided each to a different workman. The result was so precise that the parts when put together exactly corresponded. Where

[1] See *Builder*, vol. xlii., p. 476.

[2] Before going further, we should desire to express our indebtedness to the interesting notes of M. Gabriel Charmes on the Boolak Museum, published in the pages of the *Revue des Deux Mondes* in September, 1880.

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the work was of exceptional importance the different parts would be executed in precious metals, the head in gold or ivory, the rest of the body in bronze or alabaster. All traces of such statues have, it can easily be understood, long since vanished, or what few have been spared are but very inferior specimens. Many of the statues discovered possess the strong evidence of being portraits, some so markedly that a foreign type is recognizable in the features. Egypt we know was never an entirely self-governed country: its national life in the past, as in the present, was continually subjected to foreign influence. Too rich and beautiful not to excite the envy of neighboring nations, it has ever been a prey to foreign invasion, but while under alien rule the people, it is to be remarked, none the less preserved unchanged their marked character.

One of the heads of the Boolak Museum,—a fragment detached from its trunk,—M. Mariette has not hesitated to regard as the portrait of Menephtah, the son of Ramses II, the Pharaoh who perished in the Red Sea. The bust of his father serves as a pendant, while round these two are clustered the granite features of Thotmes III, Queen Taia, and many other interesting Egyptian rulers. It would, indeed, be a task beyond the limits of our space to describe all the curious relics of the Boolak Museum. The jewels of the Queen Hah-Hotep have been often described; of the scarabæi there is but little to be said: they rarely possess interest except when bearing some historic name. Of the papyri of the Boolak Museum it requires a *savant* to speak; some are in a marvellous state of preservation, and are decorated with all the delicacy of skill and color that give such a beauty to the Mediæval missals of Europe. The Egyptian Pantheon is, of course, represented at Boolak by an immense collection of gods and godesses, in bronze, granite, porphyry, wood, and porcelain, facts which give some idea of the condition of the industrial arts in Egypt. The technical skill of the workmen, we have evidence, was great; of their processes—they enamelled in a manner which, if it has been equalled, has never been surpassed—as of their tools we know nothing. All this portion of the museum, however, may be said to possess only a secondary interest, though it is impossible to pass over in silence the table of Saqquarah, which confirmed on its discovery in so remarkable a manner the dynastic lists of Manetho, or, again, the stèle of Sân or Tanis, a "document" scarcely the less precious than our own treasured Rosetta stone.

Perhaps the chief interest of the Boolak Museum may be said to centre in the two rooms,—devoted, one to the relics of the Ancient Empire, the second to those of the Hycsos or Shepherds.

The "Salle de l'Ancien Empire" is in itself a museum, containing, as it does, the oldest relics, perhaps, of human art. Twenty years ago the ancient empire was almost completely unknown. The studies of the Egyptologists stopped short at a great distance from this far-distant past. M. Mariette may be looked on as the Columbus of this new old world—the oldest, perhaps, of which we possess any traces. His researches brought to light a series of "documents," as our French neighbors would say, of the utmost interest. To judge by the specimens we so far possess, civilization under the ancient empire had no infancy. Like Topsy (if so flippant a comparison may be permitted), it seems, 6,000 or 7,000 years ago, to have "growed" on the banks of the Nile with the rapidity of the river-plants which come to perfection in a few years and then die down. From its first commencement this civilization seems to have arrived at perfection; but it disappears as it came. At the end of the sixth dynasty Egyptian civilization collapses suddenly, only to reappear, four centuries and a half later, in the eleventh dynasty. During this long lapse not a relic or a fragment shows us the existence of the Egyptians. It would seem as if the Nile had, during those long generations, unintermittently covered the country up, as it does for the few months annually. Nothing is stranger than this long interlude in the history of a people, the most industrious builders of the whole of mankind. No invasion explains the gap, for no ruined buildings of an earlier date attest the passage of an enemy. "Egyptian civilization," as Mariette puts it, "sank in a cataclysm only the more inexplicable as it has left nothing standing, not even ruins." When, four centuries later, civilization holds up again its head its character is deeply changed: it is no longer the genial spirit of the earlier days; in its artistic creations we can trace the grimness of the new ideal. After the representations of the happy scenes of earthly life, we have brought before us the painful travels of the soul in its journey to immortality. Mystery, therefore, it will be seen, shrouds the origin and the close of the so-called ancient empire.

It is strangely characteristic the art of this period as we see it at Boolak; it is essentially what we have come to call realistic; it is the crude representation of facts robbed of any of that high-souled ideal that forms the characteristic of Greek art; and this is the reason of the indifference with which so many regard all Egyptian art. In no manner can its inferiority be shown more strikingly than when by luck one may chance to light upon some creation even only feebly influenced by Greek teaching. Egyptian art is not beautiful in the ideal sense of the word. We are astonished at its creations; it is, as it has been described, "seen" art— not "thought" art; but the antiquity of its creations, and the spell that time throws round all it touches, place Egyptian art beyond the reach of criticism. In these rooms at Boolak it requires but a feeble gift of imagination to picture the sixty centuries that are gathered about one, and to imagine the gods those distant people adored, the poems they learned, the arms with which they fought, the wives and daughters they loved and wept for.

The more closely the creations of this mysterious ancient empire are studied, the more clearly it becomes evident that they were far from being the products of a civilization in its infancy. Plato would seem to have been aware of this: when he spoke of seeing paintings and sculptures executed, he states distinctly, 10,000 years previous to his time. But all is conjecture. Our prehistoric studies are too uncertain to allow of any positive statements respecting a period of which we possess such few remains. Perhaps it is to these distant days that belongs the Sphinx, and besides it the equally mysterious temple which in form resembles no other building in Egypt. It is simply an enormous cube of masonry formed of blocks such as even in Egypt have no equals. The mode in which this mysterious temple is built is an enigma: the stones are laid without order, and the interior seems to have been hewn out. It has been suggested that the work is the production of the period of transition between the time when man inhabited the caves, and that in which architecture first makes its appearance. In the days of Cheops, we learn from a stèle, the temple required restoration. The oldest monument, the date of which is known, is the stepped pyramid of Saqquarah of the first dynasty; it bears, however, no trace of being the production of a half-fledged civilization. The "Salle de l'Ancien Empire" is certainly by far the most interesting portion of the Boolak Museum: it shows us a glimpse into the history of a world undreamt of till within a few years.

The "Salle des Hycsos" is scarcely less interesting. The fate of Egypt, as has been justly remarked, has been inevitably to find itself under foreign rule. The researches of archæology only tend further to prove this fact, at the same time that it becomes evident how surely and completely their conquerors were absorbed by the Egyptians and their civilization. Thus it is with the great invasion of the Hycsos, who, on the authority of Manetho, spread over the land at the close of the fourteenth dynasty devastating everything,— the Huns and Vandals of ancient Egypt. Twenty years ago this character given to the Shepherd invaders was accepted implicitly, in spite of the evident exaggeration of the historian, whose statement that the invaders destroyed everything before them is amply disproved by the existence to this day of numerous monuments erected long before the advent of the Hycsos. These pretended iconoclasts research proves were humble worshippers at the Egyptian shrines.

It is in the "Salle des Hycsos" in the Boolak Museum that the story of these shepherd conquerors can best be followed. There we learn that, like their captives, they erected huge monuments. At Tanis Mariette discovered numerous remains of the work of their day, and more than one strongly stamped with the peculiar character of the foreign race.

The importance attached to the two rooms containing the relics of the ancient empire and the rule of the Hycsos will be at once seen. It was in the arrangement of these rooms that the most important modifications were introduced at the time of the recent changes made at Boolak just previous to the death of the late director. Mariette gathered in the former of the two rooms everything connected with the mysterious epoch in which civilization made its first appearance on the banks of the Nile, and, perhaps in the world. In the second room he gathered together the relics of a period which till recently has been utterly misrepresented.

The Boolak Museum is not, it will be understood, merely a collection of archæological objects gathered without an aim and shown without system: it is the result of a long period of learned and earnest research, doggedly followed out and amidst the most trying difficulties; the work of a single man who in twenty years brought to light these treasures, buried for so many centuries under the dust of time. It is scarcely remarkable that the collection should bear a strong idiosyncrasy. And yet the Boolak Museum is but a small portion of Mariette's labors scattered over the length and breadth of the land. Mariette Bey was, indeed, a true archæologist.

Historic archæology is a science, which, as he plainly showed, requires followers not alone merely intelligently strong, but gifted with exceptional energy of character and firmness of will. Egyptology is a branch of archæological research which demands in a large measure these qualities; it is the study of a history which carries us back farther than the researches of the Indian, the Assyrian, the Chaldean, and the Sanskrit scholars. But much yet remains to be discovered. It is only in its general features that the subject has been so far approached: the details are each day being filled in. Even those historical periods with which the Egyptologists are comparatively familiar contain many an unfilled gap. Egyptian art, religion, and philosophy only offer so far a series of unsolved problems. The elements of the science exist, the foundations have been laid, the progress of erection is determined on, but that is all; there yet remains much to be done before Egyptology can venture to place itself beside the great discoveries of the century. It is, perhaps, alone in Egypt, on the spot, that the subject can be fairly studied in all its bearings, and it is in such a museum as that at Boolak that more can be learned in the course of a few hours' study than elsewhere could be acquired after much laborious research.

Placed as it is at Cairo, on the banks of the solemn Nile, the Boolak Museum is a bond which unites the living present with the distant past. It is an institution, though of foreign organization, purely Egyptian. It contains the history of a land interesting to every

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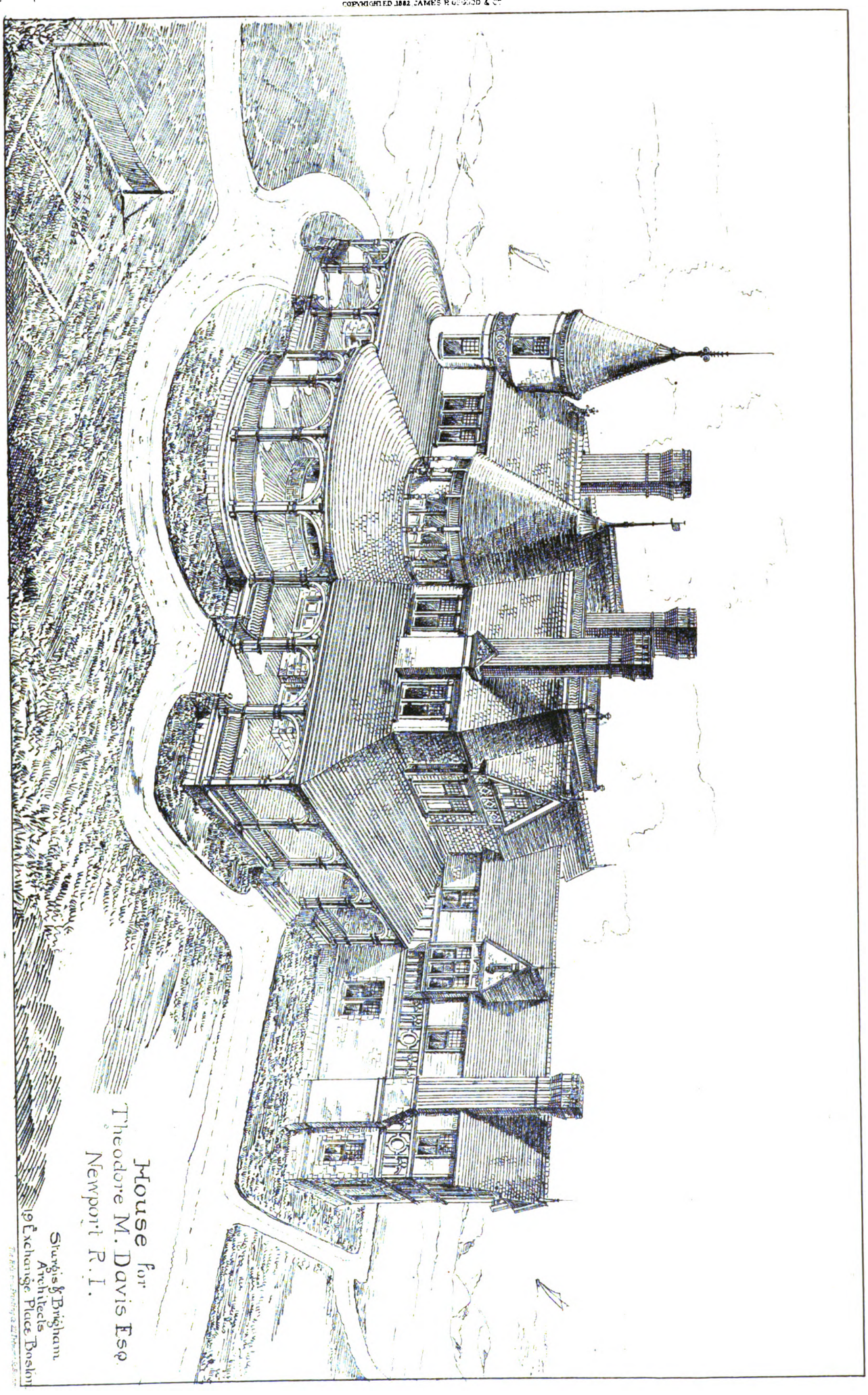

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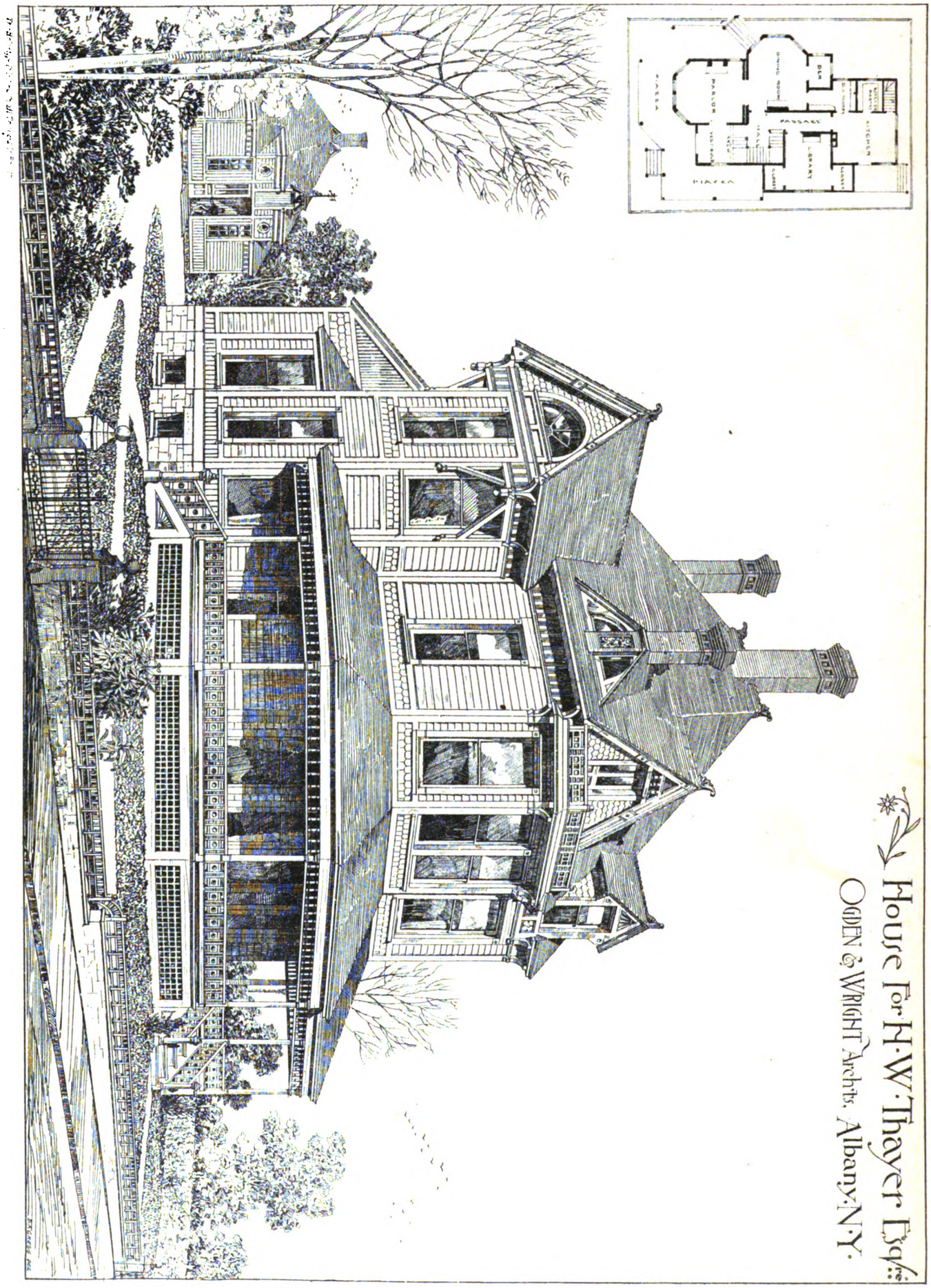

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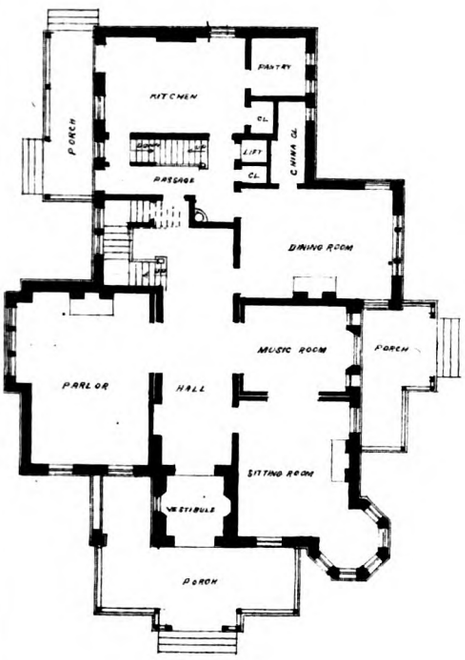

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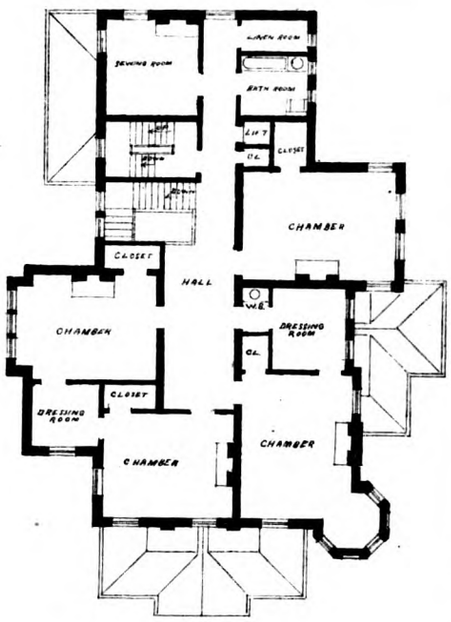

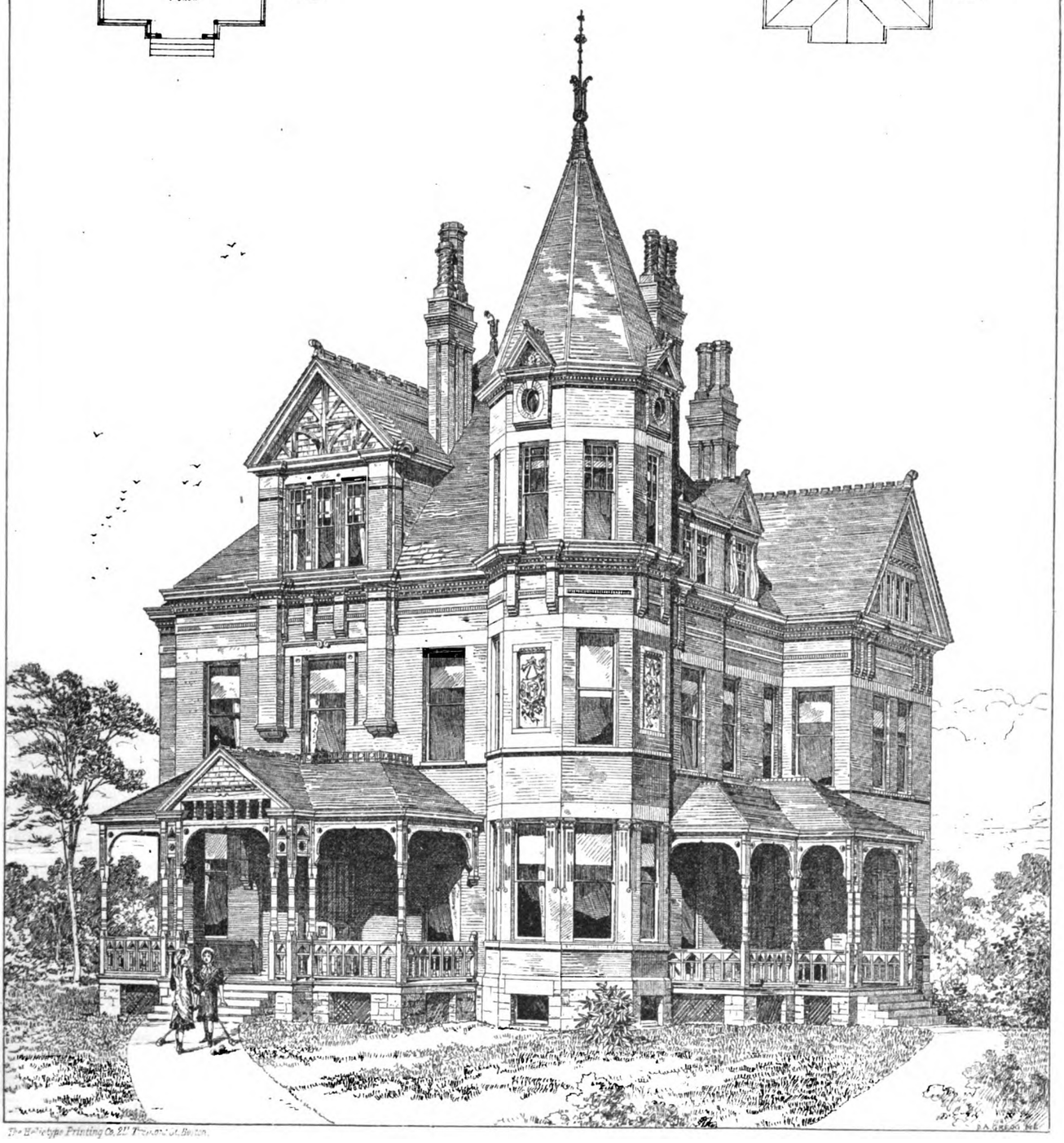

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civilized nation. The refined portion of the world would deeply regret to see the Boolak Museum dispersed. Years ago its fate caused constant pangs of fear to its director; but of this fact we may be sure, that should Boolak lose its museum, Cairo, with all its romance, its beauty, and prestige, would lose one of its brightest gems. Beside the grandeur of its mosques, its shady picturesque streets, and its over-towering historic Pyramids, Cairo would be wanting in one of its greatest features were the city of the Thousand-and-One Nights to lose its museum at Boolak. — *The Builder.*

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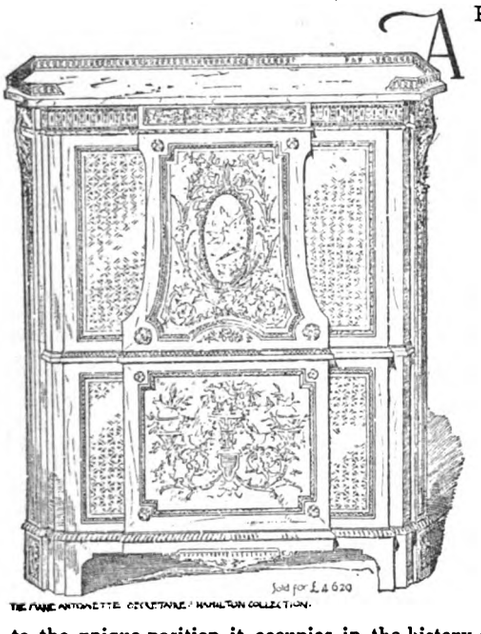
ST. MARK'S, VENICE.[1]



THE MARIE ANTOINETTE CASSETTANE HAMILTON COLLECTION.

AFTER the first row in a gondola from the station to his hotel, giving just a glimpse of the Grand Canal as he crosses it in his main reach, midway between the palace of the Foscari and the Rialto bridge, every visitor, I suppose, provided he arrives by daylight, goes straight to St. Mark's. It is a building which has, perhaps, greater fascination for most travellers than any other, and this is, no doubt, due mainly to its supremacy in colored decoration, but partially also to the unique position it occupies in the history of architecture, so that there exists no other church with which to compare it. It is not surprising, then, that its restoration should have occasioned a good deal of feeling; but though much has been written deprecating what has been done, not many persons, probably, are aware of what it amounts to, and some account of it may be interesting to them.

The greater part of the work is external. The only parts of the basilica which are visible outside are the west front facing the Piazza, a short return of two bays on the south side towards the Ducal Palace, facing the Piazzetta, and on the north side as far as and including the end of the transept. All the eastern part is surrounded by other buildings, and has never been faced with marble. Of these three fronts the two side ones have been entirely renewed, and the workmen are at present engaged upon part of the façade itself. Where the restorer has been the marble facing and the small mosaic patterns introduced into it are completely new, hardly a slab of the ancient covering having been left or replaced in its original position, and it is difficult to believe that anything but a liking for the glistening aspect of the new stone can have caused this wholesale change, for it is to be remembered that the external covering is of absolutely no structural value: a cracked stone would in no way endanger the fabric, it would only require to be firmly fixed to the wall behind and all would be well, or if the wall itself was in a dangerous condition it might have been rectified, and the marble then replaced as it stood before. I am unable to compare the new work with that which previously existed in its place, but it is fair to presume that a similar method was followed there and in the west front, and any one may note the great contrast between the new and the old work at present existing. First in the color, the old marble is (or was, at present it has a yellowish tinge) mainly white, with few but well-defined veins: the new is traversed by an immense number of parallel veins so as to give an effect more gray than white. Secondly, in the arrangement in the old work the slabs are placed so that the veins run diagonally across them, often more nearly horizontal than vertically, and in the adjoining slabs the veins run in the opposite direction, so as to form a rude zigzag pattern, and to mark every joint clearly: in the new the slabs are, indeed, similarly opposed to each other, but the lines are placed so nearly vertically that the eye does not at once catch the change, and the joints are nearly invisible, so that the effect is as though the external wall was of one piece, covered with regular up-and-down streaks. The old builders appear to have aimed at getting as great variety as possible in a small space, the modern ones to desire a perfect uniformity. There is another very marked difference, which, however, may not fairly be made a charge against the restorers. Mr. Ruskin and Mr. Street, the teachers of truth in architecture, have upheld the Venetian system of veneering, on the grounds that the slabs are generally placed so that their height considerably exceeds their width, while bricks and building stones are almost invariably placed with their greatest length horizontally, and that they are fixed to the wall and to each other by conspicuous rivets, so that no observer is likely to be deceived, and suppose the wall built of the precious material. Now, no rivets occur in the restored work. In parts of the old it is true that they are very conspicuous; but, again, there are wide tracts in which there are none at all, especially on the internal walls. The detection of this difference of workmanship naturally led to a closer examination of the parts which appear, at first sight, glued onto the wall, and this revealed the fact that every slab was fixed by a row of nails along the lower edge, and usually a few at intervals up the sides, the upper edge being presumably dovetailed under the lower one of the succeeding slab, for there are never any nails there. And this system of fastening prevails everywhere, both where there are also rivets and where there are none. The rivets, on the other hand, are to be found very thick over some parts of the building, especially in places where the slabs have been cracked, in which case the cracks are riveted in similar fashion to the adjoining joints, while in other parts there are not only no rivets, but there are no holes left by rivets which have fallen out; in fact there never were rivets. It is clear, in fine, that wherever rivets occur they are a subsequent addition — a patching up of the original fabric where it was failing, and, in fact, they were applied precisely as is now done to a broken plate. Consequently, the want of rivets in the new work is no fair subject of complaint. There are no nails either: the method of fixing is entirely concealed; but, inasmuch as the original builders certainly intended to reveal no truth by their nails, making them, indeed, as little conspicuous as possible, there is no objection to modern science dispensing with them altogether. But the two facts mentioned before, trivial as they may seem to some, serve to differentiate the new work strongly from the old. It may possibly be considered an open question whether the present action is not improving the appearance of the building; but that is altogether a different matter from whether it is a good and faithful restoration. After finding fault with what the restorers have done it seems hard to complain also of what they have not done; but there is one piece of restoration I should much like to see taken in hand. In the Academy at Venice there is a picture by Giovanni Bellini, dated 1496, of a procession in the Piazza. The square as he draws it is much smaller and more unpretending than the splendid one we see to-day; but what concerns us at present is his representation of St. Mark's, whose front occupies the whole background of the picture, and is so accurately painted that we may fairly trust the picture where it differs from the present building. And it does differ considerably, not in the architecture, but in the general appearance. In the picture gilding is laid on freely where there is none now; the rings of sculptured foliage round the central doorway are gilded, leaving the figures which occur among the leaves white; so are the four celebrated horses above (and these retain fragments of the gold still); so are the glorious crockets over the gables, again leaving the figures standing out white; also the pinnacles, and canopies between the gables, and the figures which surmount the gables have golden glories. What a magnificent addition all this gold would be to the building again, which sadly wants it to carry off the strong colors and gilding of the mosaics which appear at present so many spots of light in the sunshine! What is intended to be done with these mosaics I do not know. To the left in the lower series is a very interesting one, representing the conveyance of the body of St. Mark into the church, and the church is shown as it existed in the thirteenth century before any of the crockets or statues were added. This has been slightly restored, and is now quite sound. All the others are of the seventeenth century or later, and the upper row very dilapidated; but they are by no means worth restoring, and should be replaced by others if better can be obtained. Almost in all cases the old caps and other sculptured decorations have been respected and retained, so that we can conclude this review of the external restorations with a word of praise. But there is another restoration going on on the other side of the Piazzetta — that of the Ducal Palace — and in a very wholesale manner. Much of it, however, it is plain, is absolutely necessary. The great weight of the upper story has crushed many of the stones in the two arcades beneath, and the famous capitals of the lower one have especially suffered. Many of them have previously been bound by iron rings with the intention of preserving them; but the expansion and contraction of the metal has probably contributed to their decay. Accordingly, many of them have had to be replaced by modern copies, and the carving has for the most part been admirably done, though some of the heads look as though they must be carricatures of the old work. The foliage, however, is very good throughout.

[1] From a correspondent of the *Guardian*.

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Inside St. Mark's the restoration appears to have been confined to the ceiling and the floor. There is peculiar difficulty in restoring these old mosaics, which contrive to unite decided faults of drawing with a great deal of expression and dignity of form; modern copies are apt to exaggerate the grotesqueness and eliminate the nobility. But in the church itself the work has been mainly patching, the most prominent being in the four Evangelists on the pendentives of the central dome, and the effect is by no means bad. In the baptistery, however, where the roof appears to be entirely new, these faults are very marked, though, perhaps, this may be due more to the comparative closeness of the mosaics to the eye than to any difference of workmanship. One of the indictments brought against the present restorers is that they are actually making the floor level; and it has been held on high authority that the present wavy form of the floor was deliberately copied from the sea the builders were so familiar with. But this is clearly a mistake. The floor of St. Donato also has waves at the west end, but the rest of the church is flat, and the pavement of the Piazza is laid in long regular sweeps; but this was probably copied from the church. But in the church itself it is to be observed that the floor everywhere leaves the walls and piers in a horizontal line, and only begins to curve where it gets away from them; and also that, although most of the floor consists of small pieces of mosaic, there occur besides large slabs of marble, and wherever the undulations cross them they have broken into several pieces to accommodate themselves to the curve. This is especially noticeable under the central dome, where the pavement consists of six such large white slabs, which are traversed by a deep valley running across from transept to transept. All these slabs have a continuous crack along what may be described as the water-shed, with branches running out on either side, and others also along the slopes. Whatever form, then, the floor was laid in, it certainly was not the present, and as these large stones were originally flat, there can be little doubt that the rest of the floor was so also. But it has been asked if the floor has settled so badly, which is subject to very little weight, how is it that the rest of the building is sound? The fact is that the conditions of building at Venice were very peculiar; the soil is entirely alluvial deposit, and the only foundation possible to build upon was one formed of wooden piles driven into the treacherous soil; and it seems probable that while no pains were spared to make the foundations of the walls and piers secure, something less may have been thought sufficient under the floor, so that this has failed, while the other stands firm. A source of constant irritation in all restorations is the question to what previous stage the building shall be restored. In England the choice often lies between an existing Perpendicular window and the lancets it has displaced: so here it may be open to doubt whether it is wise to restore the original flatness of the floor; but it cannot be denied that it is a restoration and not an innovation. But of the badness of the floor itself there can be no question. All that has been laid at present is the north aisle of the nave, and the most prominent feature in it consists of four peacocks. Any one who looks at these birds and then crosses over to the opposite aisle to see their prototypes must be indeed astounded at the difference. The peacocks are arranged in two pairs, and in the old work each pair is very differently drawn, and surrounded by quite different foliage; but the variety in the coloring is greater still: all four have different colored tails, with the eyes composed also of rings of different colors; and similar changes, though less marked, are to be found in the wings and the rest of the body. In the new floor all four might have been turned out of a machine, and the worst of the old forms has even been selected for them, and that has deteriorated in the copying; the colors are not exactly those of any of the old ones; but worse than any, the work is in coarser pieces, and fewer shades have been employed. It is needless to follow this comparison further, though much more might be said on the subject. It is sincerely to be hoped that no more will be done to the floor in this style.

A kindred subject is that of the changes wrought on the building by time, and there has been one very remarkable one. The marble coating inside extends to about half the height of the walls; above that all is mosaic, and the general tint of this marble is at present a deep ruddy brown, which with the ancient mosaics overhead, gives to the church a quiet red and gold coloring. But if you bring your eye down to the floor-level, you may see that constant rubbing has kept the lowest four or five feet in a state of perfect polish, which displays the natural colors of the marble, and reveals the remarkable fact that the great part of it is white, with blue veins, varied, indeed, by reds and greens, but decidedly predominant: so that when the church was new it must have been mainly white below with bright gold above, with other colors dispersed throughout in marked contrast to both the white and the gold, and the effect would have been quite different from what it is now, though it may be doubted whether its present subdued tones are not more lovely. But it would be interesting to know what has caused this change; in the porch the walls are white still, and in external work the white fades to yellow. Can it be due to the smoke of the incense? It is true that the walls of the choir are darker than the rest of the building, but it seems improbable that that could have so much effect down to the end of the nave.

Those who are fortunate enough to spend Easter at Venice, or to be there for another of the great feasts, have an opportunity of seeing the church to the best possible advantage. It is only on rare occasions that the reredos is uncovered—a rich work in gold and precious stones, known as the Pala d'Oro, and part of the spoils of Constantinople. A brass frontal is also brought out, and the altar laden with silver ornaments, so that the whole forms a glittering mass which completely subdues the permanent decoration of floor and walls and roof, and gives a motive and a centre to the general scheme. At other times the altar is too inconspicuous, and the eye is attracted in every other direction by preference. The extra decoration for the festival has much the effect of converting the building from a showroom into a cathedral. It is to be seen at its very best when the slanting rays of the setting sun enter at the great west window, lighting up the whole nave and choir, but falling especially direct upon the altar and its surroundings.

STRAW LUMBER.

LIKE ourselves the *Northwestern Lumberman* has discovered that people are taking a good deal of interest in straw lumber and the whereabouts of its manufacture; and as from the nature of its connections it is much better able than we are to keep posted on such matters, it has been able to publish in its last issue the following detailed account which we believe it will not object to our republishing for the benefit of our many inquirers:

From time to time more or less has been said about the manufacture of straw lumber, a material likely to come into use as a substitute for wood. About two years ago, as set forth in the *Lumberman* at the time, Mr. S. H. Hamilton, of Lawrence, Kansas, began the manufacture of straw boards by a process by him invented and patented, and the results were watched with considerable interest. This gentleman, however, was so unfortunate, it will be remembered, as to have his establishment, which was limited in extent, burned at about the point when his machinery was in good working order. Something over 1,000 feet of straw lumber had been made when the fire occurred, and was mostly scattered among interested parties as samples. Though this product was necessarily imperfect, as the result of early efforts largely experimental, it was found to be a most valuable invention, and in many ways capable of taking the place of ordinary lumber.

But since that time little that was definite has been said about the enterprise, except in a local way, and it has been a subject of conjecture as to whether the disaster met with had put an effectual quietus upon further operations in that direction. Such was not the case, however. Some little time afterward the patentee succeeded in getting men of capital interested in the matter, who, being practical men, were readily impressed with the importance of the industry. The overtures made resulted in the formation of the Hamilton Straw Lumber Company, with the following officers: S. H. Hamilton, president; C. W. Hilliard, vice-president; F. C. Clark, secretary. Mr. Hilliard is a Chicago gentleman, and two other prominent Garden City representatives are stockholders, namely, H. H. Porter, president of the Chicago, St. Paul, Minneapolis & Omaha railway, and R. R. Cable, vice-president of the Chicago, Rock Island & Pacific road.

The company began operations in a preliminary way, with a capital of about $25,000. A new mill was built at Lawrence this year, which was gotten under headway in May. After running about a week it was ascertained that the steam presses were inadequate, and new ones of greater power were put in. After some little delay operations were resumed, and the mill is now in thorough working order, and turning out a limited supply of a remarkable product. The mill is 36′ x 150′ in extent, and the storehouse for drying the straw lumber is 25′ x 50′. The machinery is, in the main, constructed especially for the purpose, but a part of it is in some respects similar to that commonly used in paper making. All kinds of straw are used, the raw material being first made up into pulp by the ordinary process, and then rolled into thin sheets, about twenty-four of which would make an inch in thickness. While wet and hot, and in a condition to readily absorb liquids, these sheets are passed through a vat of chemicals heated to 280 degrees Fahrenheit, the excessive temperature being sufficient to scald the liquid into the sheets till they have become thoroughly impregnated with the chemicals, wherein lies the great secret of preparation, and by which satisfactory results are secured. After this the sheets pass through ten pairs of polished iron rollers, drawn so closely to each other by means of powerful steam-pressure that the space between them is not perceptible. The sheets are forced through apertures which apparently do not exist. Cement is applied by the operation of mechanism to which a system of brushes is affixed, and a further pressure is applied, ultimately resulting in the production of a hard and firm substance, comparatively fire-proof.

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After being made the lumber must be permitted to dry thoroughly, which requires from a week to a month. A storehouse free from dampness is required. Kiln drying probably would not answer. If used before it is dry the lumber will warp, but will not when dry, which fact has been demonstrated by use. So far the lumber has been made principally into flooring, ceiling, blackboard strips, and friction-wheels. The present machinery can only turn out boards of different thicknesses, thirteen feet long and three feet wide, which can be sawed into any shape, the same as common lumber. The boards cannot be split into less thicknesses, but must be made the right thickness for the use intended. More extensive machinery could be had, so that the lumber could be made any length, width or thickness likely to be desired in any practical use. While the capabilities of the straw lumber, when fully perfected, seem limitless, the manufacturers make no extravagant claims for it, only seeking to have it applied to the more simple and practical wants till experience and results shall extend its sphere.

All that the *Lumberman* can say for the material will be to present the facts given as a result of the application and tests that have been made of it so far, for time will best prove its merits. When finished it looks what it is,—a slab made out of straw. The surface has an appearance of unevenness which is deceptive, for while it looks rough it is found to be smooth. The materials and fibres of which it is composed give it a streaky appearance. It is very hard, compact and firm, saws perfectly smooth, and a nail can be driven through it very cleanly and without disturbing the surrounding part —that is, it neither cracks, splits nor tears, as wood sometimes does. It is claimed it can be worked without difficulty or injury. So far as grain is concerned, it has none; the layers cause a sort of grain on the edges, but of course it counts for nothing there. The proposition is that it can be readily polished, finished and decorated upon the surface in any conceivable or desirable manner, or sawed, planed, and worked the same as wood.

It is believed it has an endurance equal to or greater than most wood, and satisfactory tests are said to have demonstrated it to be fire and water proof to an extraordinary degree. It can hardly be soaked or burned. It is claimed a roof constructed of it could not burn through in less time than twelve hours, while the drier it is the greater its power of resistance to fire.

It has been used for floors and ceilings and appears to have substantiated all that is claimed for it in that direction. It has also proved a success when made into friction-wheels, and this is a good test of the wear and tear it can withstand. Paper friction-wheels are made which soon give away, and sole-leather wheels, though much better, cannot stand the grief long. A wheel $1\frac{3}{4}''$ thick, costing 20 cents, has outlasted three sole-leather wheels, 5" thick, and costing $1.50 each. The slabs, when of the same thickness as ordinary lumber, are a large per cent heavier, and for that reason can not be so well used in certain directions. This objection arises as to table-tops, buggy bottoms, and in various other uses. In many cases a less thickness and consequently less weight would answer all requirements. It is proposed to use it extensively for veneers.

There are so many articles made out of paper or materials manufactured from straw, that the question naturally arises as to the real difference between straw lumber and the more durable kinds of paper-board. Now-a-days nearly everything is made out of paper. Everybody has heard of paper car-wheels — we ride over them every day. It might then be reasoned that a substance which could be made into a car-wheel would do for a floor to walk on. The point needs elucidation. Car-wheels and straw lumber are not made alike, else there could be no patent on the latter. We have given a general idea of the manufacture of the lumber. Car-wheel stuff is made in a much more simple way in all the establishments regarding which the *Lumberman* has any knowledge. In the first place six sheets of ordinary brown paper are pasted together and subjected to a hydraulic pressure of 400 tons weight. Then these sheets are taken to the thickness of half an inch and subjected to the same pressure, and the layers thus formed continue to be so pressed till of the right thickness and firmness. This is the process in the abstract There is no chemical preparation. When made into the right shape iron plates are placed on each side of the paper interior, and all are firmly fastened together by a system of rivets, then an iron band or tire is added, and this constitutes the car-wheel. One, which had made revolutions sufficient to the travelling of 250,000 miles, when taken apart showed the paper portion to be twice as compact and serviceable as at first, and worth twice as much for a new wheel. The same theory, it is thought, will apply to straw lumber. It will be observed, however, that the whole of a car-wheel is by no means made from paper, as many no doubt have supposed was the case.

Reference has been made to different kinds of straw lumber, but it appears that the patent under consideration is the only one that has been taken out. The gentlemen interested took great care to look the matter up thoroughly and ascertain the full facts. A patent office expert was retained, who made an elaborate investigation and submitted a report, covering the last 100 years, upon all inventions pertaining to the manufacture and use of any substance or material of which straw was the basis. Nothing touching the subject of lumber was found by the research, and the company is satisfied that theirs is the only patent for straw lumber.

A test regarding the strength of the lumber demonstrated that a slab $\frac{3}{8}''$ thick, supported at each end, would bear up, before giving away, the same weight which would break down a pine board 1" thick, supported in the same manner.

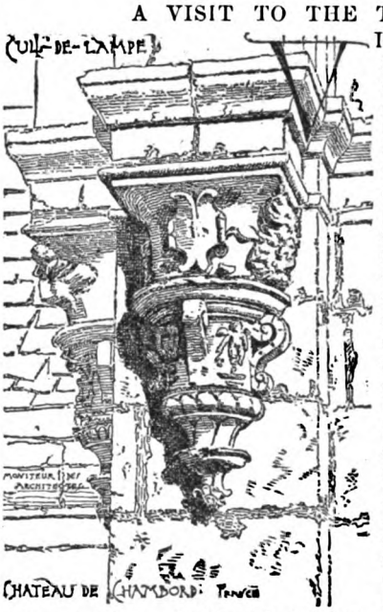
It is naturally important to know how readily the raw material for this lumber could be supplied. An acre of ground will average about three tons of straw, and 1,000 acres, or 3,000 tons of straw would make about 1,606,000 superficial feet of inch-thick slabs. The manufacturers have no fear about securing all the straw necessary, but if enough could not be obtained within a reasonable radius of territory, so that freights must be added, the cost of manufacture would become considerable. Upon the question of cost present facilities will not permit of the product being manufactured quite as cheaply as pine of the same thickness, but it is regarded as worth more than that lumber, and equal to hard wood. The great value of the invention is understood to rest in the fact that it will furnish a substitute for lumber when that commodity shall become, as it will, decidedly less plenty than it is now. But the projectors do not believe that the exhaustion of timber will make itself particularly felt for a half century into the future.

This lumber is now to be introduced in Chicago in the most practical manner. Mr. John V. Farwell, who is widely known as a heavy dry-goods operator, has decided to use it in a large new building now being erected, corner Market and Monroe Streets, six stories high, and covering an entire block. He, in company with Mr. William Edgar, who has charge of all the building permits issued under the city fire regulations, and Mr. J. M. Osdell, the architect of the new building, visited Lawrence recently and subjected the Hamilton lumber to all the necessary fire tests, to the satisfaction of all parties. An order was then given for 100,000′ of flooring, 480,000′ of ceiling, and a large amount for counters, doors, etc. Only 60,000′ were ready for shipment, which amount is about the capacity of the mill for a week. With this order and others now taken, the mill will be pushed for some little time. Several orders for friction-wheels have been refused.

The company is proceeding cautiously and will increase facilities as soon as the value of the lumber is established, and at the right time it is intended to add some $50,000 to $75,000 to the capital.

It is by no means absurd to presume, figuring upon the basis of present operations, that in the course of time straw lumber will become so perfected as to enter generally into building and manufacturing economies, though there would always be some question about trusting a straw block in place of an oak sill or stud. It is now proposed, however, to press the material into rails, balusters and newels.

A VISIT TO THE TUILERIES.



VISITORS to Paris will in a few years seek in vain for the ruins of the Tuileries, built on the plain of the Sablonnières, and deriving its name from the tile kilns which surrounded the house of the Sire de Villeroy, pulled down afterward to make way for the château Catherine de Medicis, built when she refused to reside within the precincts of the old Louvre. Guide-books and historians will tell the tale of the Tuileries. Ciceroni will point to the secret passage which leads to the Place de la Concorde and served to protect the flight of Louis Phillippe and the Empress Eugénie. M. Francisque Sarcey will be able to tell future generations all about the palace where the guests of the Empire had met, where many a stirring incident had taken place, and the chronicles of which have been handed down in the secret memoirs of Merimée, which are to be published shortly. The history of King, Emperor, and people is under the charred ruins, which are to be carted away. There is the picture painted by Meissonnier, limned *con amore*, which is to be hung up in the museum the city of Paris will erect on the site of the Tuileries. The painting will recall the ruins, and show the tumbling walls of the chapel, which was used as a place of meeting by the members of the Convention, and where the dread Committee of Public Safety held its assizes. Louis XVI left the Tuileries to go to the Temple, and he was guillotined in front of the Palace on the Place de la Revolution. Robespierre, with his jaw all bleeding, was taken to the Tuileries before he was pursued to the scaffold amid the shouts of execration of those who dreaded him when he was all powerful. Architects have examined the walls of the Tuileries, and have arrived at the conclusion that the whole of the building must come down, and as the people do not care to rebuild a new palace, the idea put forward by Janin in 1830

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will be carried out, and a museum will hide from future visitors to Paris the blackened stone which attests the horrors of a civil war.

Offers have been made to the Government for the disposal of the ruins of the Tuileries. Certain sanguine speculators proposed to form companies for the purpose of excavating and discovering the treasures they felt certain were hidden. An Englishman wanted to pull down the building at his own cost, without any expense to the Government, on condition that he might be allowed to dispose as he liked of the materials and anything he might find. This proposition was declined, and the promoters think that the refusal of the stranger's offer confirms the opinions they have entertained as to the secret treasures. M. Sardou is to have some of the marble columns from the Salle des Maréchaux, and M. Picart, the Government contractor, promises that he will not have to wait too long. Before M. Picart commences his work of destruction, it is well for those who can boast of friends at court to visit for an hour or two the ruins where, during twenty long years of prosperity to France, the Empire was installed; where Napoleon III dispensed his favors to all who had the slightest claim on him, and where the Empress was worshipped by all who knew her. Care has to be taken in visiting the ruins, as the least vibration, such as that produced by a cart passing along the street, is quite enough to unsettle some portion of the charred stone-work, while the stairs leading from one part of the building to another are not over safe. Entering by the principal door facing the Champs Elysées, the work of destruction appears to be complete. There are heaps and heaps of débris, charred marble, iron twisted and warped with the heat, pieces of looking-glass half liquefied by the action of the flames, portions of some of the statues which formerly ornamented the palace — in fact, odds and ends of every description, including old boots and shoes worn, or rather cast off by the precious scoundrels who formed the armed bands of the Commune and commenced the work of destruction by firing the Tuileries.

The grand house is in ruins; the least movement from the birds which quit their nests and fly out at the approach of any stranger brings down a shower of plaster and stones. The ground is covered with rank weeds knee-high, with here and there some bush, which has grown out defiantly from among the ill-smelling vegetation. The mouldings on some of the ceilings are hardly scorched by the flames, but the walls and windows have been charred and well-nigh consumed. The chapel where the Convocation met is burned out, and care has to be taken in treading the flooring, which almost threatens to precipitate the visitor into some *oubliette*. The colonnade of the chapel is intact, as also the iron and marble staircase of the main building leading to the vast Salle des Maréchaux. The bronze and ormolu balustrading has been destroyed, and the long trains of court dames would hardly look well sweeping over the thick dust which has accumulated nearly a foot deep on the grand staircase. Here and there the last tenants of the Tuileries — the mob of Communists, who delighted to hold their saturnalia in the palace of King and Emperor — have written up obscene remarks or galling allusions to the fallen régime, proving by their orthography that those who attempted to inaugurate a second Age of Reason had commenced by banishing the school-master. The word "Badinguet," the name of the bricklayer whose place Louis Napoleon took when he made his escape from the fort of Ham, is to be found frequently on the walls with the famous inscription, "*Mort aux voleurs*," which might have been further embellished with the proviso "when caught." There is the grand banquet hall where most of the reigning sovereigns who visited Paris during the great exhibition were received by the Emperor. The handsome gilt columns have not been much damaged, but the flooring cracks and yields under the feet of the visitor, and the marble bust of the Emperor, which once adorned the niche, lies shattered on the floor. The Salle des Maréchaux has suffered greatly from the fire. The place where Mme. Agar stood and declaimed, swathed in the blood-red banner of the Commune, "La Marseillaise," is in ruins.

The names of the victories achieved by the Napoleons can still be read in the vast room where, on the 15th of August each year, Napoleon III, surrounded by his Marshals, received the homage of the Army, and where the legend of the Legion of Honor, "*Honneur et Patrie*," was emblazoned in letters of gold on the walls, surrounded by such glorious souvenirs as "Jena," "Marengo," etc. The flames have worked ruin in the private apartments of the Empress, but the ceiling in the boudoir where Mme. de Galiffet, with the Princess de Sargan and others, met to discuss some new fashion with the imperial leader of *ton*, has remained intact. The private apartments of the Emperor have been spared. They have been boarded up to prevent the incursions of those who wander at nights, and a long detour has to be made to reach the balcony where the last of the Napoleons sat and smoked his legendary cigarette, watching the setting sun gild the dome of the Invalides, where the great captain lies sleeping his last sleep on the banks of the Seine, in the midst of a people the page of whose story, the brightest or blackest, was filled with his fame. There is the lobby and the ante-chamber, where Marshal St. Arnaud drew his sword on his companion, Gen. Cornemuse, and killed him, and there is the study where the third Napoleon sat looking over the proof-sheets of the "Life of Cæsar," or reading listlessly the prophetic poetry of the man he called "Monsieur" Victor Hugo, and whose "Châtiments" made him the Josephus of the Commune. The visitor cannot help pausing from time to time to reflect over the past. Each piece of marble disturbed by the foot brings to mind mournful reminiscences. The history of the Third Empire is written in the dust which lies on the ground, and may be built up from the fragments of busts which are scattered here and there, as if all the King's horses and all the King's men could never put together the pieces of that empire which sank into the dust at Sedan. — *London Globe.*

AN ART AND INDUSTRIAL EXHIBITION IN THE CAPITOL AT WASHINGTON.

A NATIONAL Bazaar, Art and Industrial Exposition will be held in the rotunda and adjacent halls of the National Capitol, at Washington, D. C., November 25th to December 3d (inclusive), 1882, as authorized by joint resolution of the Senate and House of Representatives, August 7, 1882. The object of this undertaking is to raise funds with which to erect a statue in this city to the memory of General James A. Garfield, late President of the United States, which work is in the hands of a committee of the Society of the Army of the Cumberland, who have already collected for this purpose some twenty thousand dollars, and expect, with the results of the exposition, to have a sufficient sum with which to erect a work befitting the great name it is proposed to commemorate.

The art exhibition will be under the direction of the leading artists resident in Washington. It is hoped that artists throughout the entire country, professional and amateurs, will aid the work by contributing some one work — as a gift to the fund — to be sold for its benefit, and be willing to exhibit others, under such rules and regulations as may be determined by the Board of Direction. All persons desiring to contribute in any way to this great work are cordially invited to do so, and to proceed in such manner as their judgment may dictate.

Contributions from the ladies in the way of needle and fancy work are especially invited and anticipated as one of the more prominent features of the exposition.

To manufacturers this exhibition offers opportunities second only to the Centennial Exposition. Occurring on the eve of the assembling of Congress, and at the season of the year when all the foreign representatives are at their legations, every exhibit will have the attention, not only of our own representatives, but of the representatives of all the civilized nations, as well as the representatives of the Press, who will gladly make full mention of all worthy exhibits; this, with the fact that each donation or exhibit contributes so much to a work that must commend itself to every patriotic citizen. All exhibits will bear the name of artist, manufacturer, etc., and will remain in place until the close of the exposition. Arrangements for transportation of exhibits are being made, and details will be given on application to the Board of Direction, rooms 90 and 96, Ebbitt House, Washington, D. C.

THE SIPHONAGE AND VENTILATION OF TRAPS.

To the Editors of the American Architect: —

Dear Sirs, — I notice in your last paper, on page 119, a reference by Col. Geo. E. Waring, Jr., to my report to the National Board of Health, which is so inaccurate that I can only infer that the gentleman commented on the paper before he had read it. He says, "While Mr. Philbrick caused the siphonage of traps — not always but sometimes — with a thoroughly ventilated soil-pipe, he did so with a combination of discharges from different vessels that would very rarely, if ever, occur in practice." If Col. Waring will refer to the report which was published in the *Sanitary Engineer* on the 31st of August, and also in your last issue, he will find at B — 1, 2, etc., that a 4-inch trap connecting with a soil-pipe open at the top lost its seal four times out of five when but half a pailful or even less water, was poured into it, with no "combination" whatever of flow from other places; also, other instances under headings "C" and "D," quite at variance with the reference quoted above.

Yours, etc. Edw. S. Philbrick.

NOTES AND CLIPPINGS.

Cloth Tracings. — A correspondent of the *Moniteur Industriel* refers to the difficulties encountered in tracing upon cloth or calico, especially the difficulty of making it take the ink. In the first place, the tracing should be made in a warm room, or the cloth will expand and become flabby. The excess of glaze may be removed by rubbing the surface with a chamois leather, on which a little powdered chalk has been strewn; but this practice possesses the disadvantage of thickening the ink besides, it might be added, of making scratches which detract from the effect of the tracing. The use of ox-gall, which makes the ink "take," has also the disadvantage of frequently making it "run," while it also changes the tint of the colors. The following is the process recommended: Ox-gall is filtered through a filter-paper arranged over a funnel, boiled and strained through fine linen which arrests the scum and other impurities. It is then placed again on the fire, and powdered chalk is added. When the effervescence ceases the mixture is again filtered, affording a bright colorless liquid, if the operation has been carefully performed. A drop or two must be mixed with the Indian ink; and it also has the property of effacing lead-pencil marks. When the cloth tracings have to be heliographed raw sienna is also added to the ink, as this color unites with it the most intimately of any, besides intercepting the greatest amount of light.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

263,670. SLIDING-DOOR. — Robert Bauch, Rockford, Ill.

263,696. WATER-SINK. — William J. Granlees, Philadelphia, Pa.

263,702. BORING AND TENONING MACHINE. — Chester A. Hodge, Beloit, Wis.

263,705. HEATING-STOVE OR FURNACE. — Maurice B. Hull, West Orange, N. J.

263,713. AUTOMATIC WATER-ELEVATOR. — George W. McKenzie, Harrington, Me.

263,714. WIND-MILL. — George W. McKenzie, Harrington, Me.

263,723. FIRE-ESCAPE. — Benjamin F. Pike, Leadville, Colo.

263,734. DUMB-WAITER. — George F. Skinner, Poughkeepsie, N. Y.

263,736. MOLD FOR MANUFACTURING CEMENT PIPE. — N. W. Stowell, Los Angelos, Cal.

263,739. STEAM-HEATING APPARATUS. — Eduard Werner, Grimma, Saxony, Germany.

263,752. MORTISING-MACHINE.—Algernon S. Bangs, Augusta, Me.

263,771. DOOR-OPERATOR. — Clarence V. Derr, Cumberland, Md.

263,773. SAFETY ATTACHMENT FOR ELEVATORS.—William Edson and Nathaniel M. Lowe, Boston, Mass.

263,775. FIRE-ESCAPE. — Ezra Emmert, Dixon, Ill.

263,793. CHIMNEY-TOP. John G. Lindemann, New York, N. Y.

263,794. WRENCH. — Dolphus S. Maynard, Auburn, N. Y.

263,823. TILE-MACHINE. — John F. Stephenson, Edgar, Ill.

263,835. ROOFING TILE OR PLATE. — Thomas B. Atterbury, Pittsburgh, Pa.

263,841. RECEIVER FOR DISINFECTANTS. — James W. Burkett, Brooklyn, N. Y.

263,782. VISE. — John Dennis, Lowell, Mass.

263,783. MANUFACTURE OF HYDRAULIC CEMENT. — Edwd. J. De Smedt, Washington, D. C.

263,877. WATER-CLOSET ATTACHMENT. — Sigmund Edinger, New York, N. Y.

263,903. FIRE-EXTINGUISHER. — Alphonso S. Harris, Chelsea, Mass.

263,914. BRICK. — Edwin A. Kern, Girard, Ohio.

263,922. BURGLAR-ALARM. — Ferdinand A. Langewald, Chicopee, Mass.

263,947. ELECTRIC BURGLAR-ALARM. — Horace F. Neumeyer, Macungie, Pa.

263,950. LOCK-HINGE. — William C. Peckham, Troy, Ohio.

263,952. FIRE-ESCAPE. — Thos. Penn, New York, N. Y.

264,053. DEVICE FOR HANGING VENETIAN BLINDS. — Chas. M. Young, Lockport, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report thirty-three permits have been granted, of which the following are the more important: —

Annie C. Johnson, two-st'y brick stable, in rear of Hollis St., between Calhoun and Stricker Sts.

Alexander R. Horner, 5 two-st'y brick buildings, Vincent Alley, west of Lorman St.

Thomas E. Masson, two-st'y brick building, Wolf St., north of Madison St.

C. W. Rockafeller, 15 three-st'y brick buildings, George St., east of Arlington Ave.

Catharine Falvey, two-st'y brick building, Ringgold Alley, between Ramsey and McHenry Sts.

James P. Byrne, three-st'y brick building, Gay St., between Front and High Sts.

E. Feinour, three-st'y brick building, Pearl St., north of Franklin St.

Henry Votz, two-st'y brick building, rear of Broadway, bet. Aliceanna and Lancaster Sts.

J. M. Getz, 14 two-st'y brick buildings, Wilcox St., bet. Chase and Biddle Sts.

Henry Hulseman, 2 two-st'y brick buildings, Luzerne St., north of Lancaster St.

James P. Rock, 2 three-st'y brick buildings, Liberty Alley, bet. Madison and Monument Sts.

Joseph B. Cook, two-st'y brick stable, Booth St., bet. Schroeder and Oregon Sts.

Dr. Theo. Cook, two-st'y brick building, n e cor. Randall and Patapsco Sts.

Francis H. Shallus, three-st'y brick building, n w cor. John and McKim Sts.

John Walfrum, two-st'y brick blacksmith shop, York St., east of Light St.

Elizabeth Lamdin, three-st'y brick building and two-st'y brick building, n w cor. Clement and Towson Sts.

Elizabeth Dill, three-st'y brick building, s e cor. Sterrett and Ramsey Sts.

Francis McCann, two-st'y brick building, in rear of s e cor. Eastern Ave. and Canton St.

Boston.

BUILDING PERMITS. — *Brick. — Commonwealth Ave., No.* 403, Ward 11, for G. G. Crocker, four-st'y dwell., 30' x 66'; Woodbury & Leighton, builders.

Wood. — Rogers Ave., near Ruggles St., Ward 22, for Boston & Providence R. R. Corporation, storage for cars, 12' x 200'.

Eastern Ave., near Fort Point Channel, Ward 12, for Boston Wharf Co., freight-shed, 75' x 575'.

Cambridge St., opposite Perkins St., Ward 4, for Wm. P. Parks, three-st'y mechanical, 50' x 80'; J. G. Parker, builder.

Melville Ave., rear, near Washington St., for Edwin T. Merrihew, stable, 16' 6" x 27' 8" and 27' x 35' 6"; Edw. McKechnie, builder.

Medford St., rear of, nearly opposite Corey St., Ward 3, for Palmer, Parker & Co., three-st'y sawmill, 60' x 97'; Mead, Mason & Co., builders.

Rand St., near Randlett Pl., Ward 20, for Bernard Foley, two-st'y dwell., 15' x 20' and 20' x 30'; Henry J. Bartlett, builder.

McGee St., near Norfolk Ave., Ward 20, for J. P. Fenno and J. C. Talbot, two-st'y dwell., 20' x 20'; Wm. Taskaer, builder.

Tremont St., No. 1491, rear, Ward 22, for Magnus Lepstrom, two-st'y mansard dwell., 24' x 32'; Peter Hutchinson, builder.

Auburn St., No. 17, Ward 19, for Kendall Brooks heirs, two-st'y dwell., 22' x 30'; Henry J. Bartlett, builder.

West Cottage St., opposite Woodville Sq., Ward 20, for Silas W. Browning, two-st'y dwell., 24' x 45'; Henry J. Bartlett, builder.

Bremen St., near Putnam St., Ward 1, for J. W. Hunnewell & Co., storage, 30' x 40'; E. W. Archey, builder.

Burroughs St., near Centre St., Ward 23, for John D. Rendall, two-st'y carpenter-shop, 22' x 30'; John D. Rendall, builder.

East Fourth St., near Jay St., Ward 14, for Howard Clapp, three-st'y dwell., 30' x 45'; Howard Clapp, builder.

Brooklyn.

BUILDING PERMITS. — *Fulton St.*, n s, junction Hull St., near Howard Ave., 6 two-st'y frame dwells.; cost, each, $1,500; owner, J. B. King, 5 Bainbridge St.; builders, E. Mullen and O. H. Hoffses.

Halsey St., s s, 100' w Marcy Ave., 10 two-and-a-half-st'y brownstone dwells; cost, each, $4,000; owner, architect and builder, John S. Frost, 574 Franklin Ave.

Sackett St., cor. Nevins, Degraw and Canal Sts., middle of block, one-st'y brick condenser house; cost, $8,000; owner, the Fulton Municipal Gas Co., 312 Fulton St.; architect, J. F. Harrison; builder, R. Deeves.

Wallabout St., s s, 200' w Harrison Ave., one-st'y brick warehouse; cost, $4,000; owners and builders, Charles Phizer & Co., 11 Bartlett St.; architect, M. J. Morrill.

Hart's Alley, s s, between John and Bridge Sts., two-st'y brick stable; cost, $2,100; owner, David W. Maines, 195 Nassau St., architect and builder, O. K. Buckley, Jr.

Bergen St., n s, cor. Dean St., s s, 150' w Clason Ave., 6 three-st'y frame tenements; cost, each, $3,000; owner, Mr. Williamson, 18 Court St.; architect, Thos. McCormick; builders, G. Brazell and W. Wood.

Plaza St., e s, 22' 8" s Butler Pl., three-st'y brick and brownstone dwell; cost, $4,000; owner, E. P. Rogers, 165 Stirling Pl.; architect and builder, P. B. Rogers.

Fifth St., s e cor. North Eighth St., three-st'y frame store and dwell.; cost, $3,500; owner, Henry Muller, on premises; architect, A. Herbert; builders, H. Bruckhauser and Jos. Friese.

Carroll St., n w cor. Hoyt St., 5 two-st'y brownstone dwells.; cost, each, $3,000; owner and builder, Chester Bedell, 337 Smith St.; architect, Theo. Pearson; mason, W. L. Rountree; carpenter, Theo. Pearson.

Hart St., Nos. 176, 178 *and* 180, 3 two-and-a-half st'y brownstone dwells.; cost, each, $5,200; owner and carpenter, M. C. Baker, 194 Hart St.; architect, J. D. Reynolds; mason, E. N. Wood.

De Kalb Ave., n e cor. Bushwick Ave., 4 two-st'y brick dwells.; cost, each, about $4,000; owner, John W. Howard, 1211 De Kalb Ave.; architect, D. T. Atwood.

Willoughby Ave., s s, 295' w Marcy Ave., 2 three-st'y brownstone dwells.; cost, each, about $5,500; owners, R. & E. W. Phillips, 109 Kosciusko St.; architect, E. W. Phillips.

Franklin Ave., e s, 60' s Atlantic Ave., three-st'y brick tenement; cost, $5,000; owner and mason, Philip Sullivan, 409 Decatur St.; architect, T. F. Houghton.

Sackett St., No. 724, between Fourth and Fifth Aves., two-st'y brick dwell.; cost, $3,000; owner, architect and builder, Peter Donlon, 720 Sackett St.

Eighth St., s s, 300' w Third Ave., three-st'y frame tenement; cost, $2,000; owner, W. Nelson, 128 Eighth St.; architect, T. McCormick; builders, G. Brazell and W. Wood.

Suydam St., s s, 120' e Broadway, 3 two-st'y brick dwells.; cost, each, $2,500; owner and builder, Fred. Herr, 778 Broadway; architect, Th. Engelhardt.

Flushing Ave., No. 676, s s, 100' w Throop Ave., three-st'y frame dwell. and store; cost, $3,000; owner, John Bosch, 708 Flushing Ave.; architect, Th. Engelhardt; builders, W. Rauth and L. Fieger.

Chicago.

HOUSE. — The Rev. T. H. Spinner is about to build a house on North Halsted St., to cost $8,500, from plans by W. L. B. Jenney, architect.

FLAT. — Thomas Parker is having plans made for flats at 1011 West Monroe St., by S. M. Randolph, architect. Ground to be broken next week.

BUILDING PERMITS. — F. W. Campbell, two-st'y brick dwell., 20' x 34', 850 West Monroe St.; cost, $3,600.

Mrs. J. Sheikuff, two-st'y and basement brick dwell., 22' x 52', 158 Larrabee St.; cost, $4,000.

D. H. Small, two-st'y brick dwell., 22' x 36', Millard Ave., near Twenty-second St.; cost, $2,500.

John Gillespie, two-st'y and basement brick dwell., 22' x 64', 470 Congress St.; cost, $5,000.

James Clare, one-st'y and basement brick store, 43' x 50', 276 and 278 Fifth Ave.; cost, $12,000.

H. R. Wilson, two-st'y brick dwell., 24' x 56', 90 Laflin St.; cost, $4,000.

Kee & Chappell, two-st'y brick milk depot, 27' x 40', 343 North Franklin St.; cost, $5,000.

J. F. Gillette, 8 two-st'y and basement brick dwells., 60' x 150', 3431 Vernon Ave.; cost, $30,000.

Theodore Hagedorn, two-st'y and basement brick dwell., 25' x 50', Twenty-fourth St. and Wentworth Ave.; cost, $4,000.

Cincinnati.

STORES AND FLATS. — Mr. Frank Armstrong, agent for the Armstrong estate, has commenced the erection of a building 40' on Race St., and 100' on Court St. The first story to be used for stores, and the upper floors as flats or dwellings; cost, $30,000; Mr. Henry Bevis, architect.

WORK OF THE PLANING MILLS. — The product of the Cincinnati planing mills for the past year aggregate $4,000,000. 1,100 men are employed in these mills.

BUILDING PERMITS. — Joseph Smith, three-st'y brick dwell., Tremont St., near Clark St.; cost, $5,700.

Eagle Insurance Co., four-st'y frame building, Third St., near Vine St.; cost, $2,700.

Mrs. Echert, three-st'y brick dwell., Bank St., near Freeman Ave.; cost, $5,800.

Jas. C. Harrel, two st'y frame dwell., Colrain Pike, near Arlington St.; cost, $5,000.

Wm. Miller, four-st'y stone front stove works, s e cor. Eighth and Sycamore Sts.; cost, $50,000.

M. Carmickle, two-st'y brick dwell., Calhoun St., near Ohio Ave.; cost, $3,800.

McLane & Shiegal, four-st'y brick dwell., Lawrence St., near Pearl St.; cost, $6,500.

W. S. Merril & Co., addition to two-st'y brick dwell., cor. Sixth and Eggleston Ave.; cost, $2,000.

Jas. S. Armstrong, four-st'y stone front dwell., s w cor. Court and Race Sts.; cost, $30,000; Henry Bevis, architect.

Geo. Criss, 3 three-st'y brick dwells., cor. Kemper Lane and Curtis Sts.; cost, $10,000; Chas. Crapsey, architect.

H. Hoffman, three-st'y brick dwell., Henry St., near Race St.; cost, $2,800.

Seven permits for repairs; cost, $3,700.

Total permits to date, 560.

Total cost to date, $1,655,100.

New York.

PARTNERSHIP. — Messrs. Bruce Price and Geo. A. Freeman, Jr., architects, have formed a copartnership.

STORE. — At the cor. of Chatham and Worth Sts., a six-st'y and basement triangular store, 53' and 65' x 63', of brick, iron and stone, is to be built, at a cost of about $40,000, from designs of Messrs. H. J. Schwarzmann & Co.

TENEMENT-HOUSE. — A five-st'y tenement-house, 25' x 80', is to be built at No. 72 Forsyth St., of brick with stone finish, at a cost of about $16,000; from designs of Messrs. H. J. Schwarzmann & Co.

EXTENSION. — A large extension is to be made to the residence of Mr. Anderson Fowler, from designs of Messrs. D. & J. Jardine.

ADDITION. — An extensive addition is to be made to the residence of Mr. Anderson Fowler, No. 60 East Sixty-eighth St., from designs of Messrs. D. & J. Jardine.

CONTRACTS. — The contract for building the extension to the Hoffman House has been awarded to Messrs. R. L. Darragh & Co.

The contract for building the Washington Land Co.'s edifice at the foot of Broadway has been awarded to Mr. Barney Spaulding.

BUILDING PERMITS. — *West Nineteenth St., Nos.* 544 *and* 646, three-st'y brick factory; cost, $6,000; owners, John and Robert R. Stewart, 539 West Eighteenth St.; architect, W. H. Walton.

Horatio St., Nos. 110 *and* 112, six-st'y brick and terra-cotta factory; cost, $30,000; owner, F. W. Devoe, Fulton St., cor. William St.; architects, Kimball & Wisedell; builders, M. Reed and Steele & Costigan.

One Hundred and Twenty-fourth St., s s, 225' w Eighth Ave., 2 four-st'y brick and brownstone tenements; cost, each, $20,000; owner, Charles W. Pinckney, 273 West One Hundred and Twenty-fifth St.; architect, T. E. Thomson.

One Hundred and Forty-first St., n s, 230' w Eighth Ave., three-st'y frame tenement; cost, $4,200; owner, F. Kappelman, Eighth Ave., between One Hundred and Thirty-eighth and One Hundred and Thirty-ninth St.; architect and carpenter, William Kusche; mason, —— Kraft.

Ogden Ave., e s, about 100' s Birch St., 4 two-st'y frame dwells.; cost, each, $1,500; owner, Andrew Anderson, St. Augustine, Fla.; architect, J. B. Warren; builder, E. B. Nicholas.

Cornelia St., No. 30, five-st'y brick and stone tenement; cost, $26,000; owner, Jacob Varian, 22 Leroy St.; architect, C. E. Hadden.

West One Hundred and Twenty-sixth St., No. 122, s s, between Sixth and Seventh Aves., four-st'y brownstone dwell.; cost, $22,000; owner, Emma Arnott, 448 West Twenty-fourth St.; architect, G. B. Pelham.

Philadelphia.

BUILDING PERMITS. — *Kensington Ave.*, s e cor. Somerset St., three-st'y store and dwell., 18' x 52'; Dickson Bros., contractors.

Josephine St, s s, e of Oxford St., dye-house, 83' x 150'; Greenwood & Rault, owners.

Wharton St, Nos. 1820 *and* 1822, 2 two-st'y dwells., 16' x 50'; John McConaghy, owner.

Girard Ave., n s, w of Nineteenth St., three-st'y store and dwell., 18' x 54'; Jno. M. Sharp, owner.

Nineteenth St., w s, s of Girard Ave., three-st'y store and dwell., 18' x 54'; Jno. M. Sharp, owner.

Moore St., s s, e of Broad St., 8 two-st'y dwells., 16' x 44'; James E. Conroy, owner.

Capewell St., s s, e of Gaul St., two-st'y stable, 18' x 30'; A. T. Richards, contractor.

Brown St., n s, e of Front St., 8 three-st'y dwells., 14' x 26'; Thomas A. Lynch, contractor.

East Dauphin St., No. 622, three-st'y dwell., 16' x 45'; Daniel Register, contractor.

Fountain St, n s, between Washington and Ogle Sts., 2 three-st'y dwells., 15' x 44'; Chas. Bartle, contractor.

Orthodox St., s w cor. James St., 2 two-st'y dwells., 16' x 40'; Jas. McLea, owner.

East St., s s, between Terrace and Cresson Sts., 2 two-st'y dwells., 15' x 28'; Jas. McLaughlin, owner.

St. Louis.

BUILDING PERMITS. — Thirty-six permits have been issued since our last report, fifteen of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

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Jno. Rosevelt, two-st'y brick dwell.; cost, $9,000; J. B. Legg, architect; Jno. Rosevelt, contractor.

St. Louis Mutual House Building Co. No. 3, two-st'y brick dwell.; cost, $2,600; Mortimer, architect; J. C. Brockmeier, contractor.

H. C. Rodemann, two-st'y brick dwell.; cost, $6,000; H. Hussman, contractor.

Patrick Muldoon, two st'y brick dwell.; cost, $3,500; Wm. Keane, contractor.

Walter S. Smith, two-st'y brick dwell.; cost, $4,000; Wm. Keane, contractor.

A. Bohnstedt, 3 two-st'y brick dwells.; cost, $10,000; Goesse & Remmers, contractors.

P. Casey, 2 two-st'y brick dwells.; cost, $8,000; T. Annan, architect; C. Chapmann, contractor.

C. P. Carmon, two-st'y brick dwell.; cost, $3,200; A. Beinke, architect; Geo. M. Roder, contractor.

Missouri Malleable Iron Co., two-st'y brick foundry; cost, $21,000; A. Beinke, architect; R. P. McClure, contractor.

J. Kuntz, two-st'y brick dwell ; cost, $2 600.

—— Kemper, two-st'y brick dwell.; cost, $2,900; N. Hemminghous, contractor.

Mrs. Heffermann, two-st'y brick dwell.; cost, $2,600; T. Furlong, architect; O'Malley Bros., contractors.

Jno. K. O'Heron, two-st'y brick dwell.; cost, $4,500; T. Gugerty, contractor.

S. C. Tiemeyer, four-st'y brick store; cost, $6,500; A. Beinke, architect; S. Gugerty, contractor.

J. Brown, two-st'y brick dwell.; cost, $3,700; T. Roach, contractor.

Liggett & Meyer, one-st'y brick storeroom; cost, $8,000; Jno. K. Burden, contractor.

Washington.

Building Permits. — The following are the permits issued since last report: —

Robert Downing, two-st'y and cellar brick dwell., 29′ x 46′, Ninth St., between N and O Sts., n w; cost, $3,500.

J. I. Atchison, three-st'y and basement brick dwell., 21′ 6″ x 32′, 1400 Q St., n w; cost, $4,500.

John White, two-st'y brick stable, 16′ x 28′, Eighth and P Sts., n w; cost, $2,000.

E. M. Ware, two-st'y brick dwell., 27′ x 36′, Rhode Island Ave., between Fifteenth and Sixteenth Sts., n w; cost, $2,700.

James Robbins, three-st'y and cellar brick dwell., 20′ x 33′, Q St., between Sixteenth and Seventeenth Sts., n w; cost, $5,000.

L. Sands, 4 three-st'y and basement brick dwells., 20′ x 60′, P St., between Seventeenth and Eighteenth Sts., n w; cost, $25,000.

Gen. M. C. Meigs, three-st'y and basement brick dwell., 25′ x 40′, N St., between Thirteenth and Fourteenth Sts., n w; cost, $6,500.

Firemen's Insurance Co., five-st'y and cellar brick office, 35′ x 60′, cor. Louisiana Ave. and Seventh St., n w; cost, $17,500.

D. B. Groff, three-st'y and cellar brick dwell., 19′ 9″ x 50′, Fifteenth St., between T and U Sts., n w; cost, $4,500.

D. B. Groff, 9 three-st'y and cellar brick dwells., 17′ 6″ x 33′, Fifteenth St., between T and U Sts.; cost, $22,500.

Fisher & Carpenter, 3 two-st'y and cellar brick dwells., 15′ x 32′, Sixth St., between Second and Third Sts., s e; cost, $4,500.

R. Eichhorn, two-st'y and cellar brick dwells., 19′ 3″ x 32′, K St., between First and North Capital Sts., n w; cost, $3,000.

Jas. Robbins, 11 two-st'y and cellar brick dwells., 17′ x 32′, Pierce Pl., n w; cost, $22,000.

Augustin Reiter, two-st'y brick dwell., 24′ x 37′, O St., between Ninth and Tenth Sts., n w; cost, $3,500.

Richard Rothwell, 3 two-st'y and basement brick dwells., 17′ 5″ x 32′, Tenth St., between B St. and Massachusetts Ave., n e; cost, $4,500.

Shiloh Baptist Church, two-st'y brick church, 53′ 3″ x 90′, L St., between Sixteenth and Seventeenth Sts., n w; cost, $15,000.

Mrs. S. C. Thorn, three-st'y and basement brick dwell., 19′ 6″ x 32′, New Hampshire Ave., between M and N Sts., n w; cost, $5,000.

Robert A. Tucker, three-st'y brick dwell., 22′ x 38′, Sixth St., between D and E Sts., s w; cost, $3,000.

Chris. Christiana, 3 two-st'y brick dwells., 19′ x 33′, C St., between First and Second Sts., s e; cost, $6,850.

D. B. Groff, 4 two-st'y and basement brick dwells., 18′ 4″ x 37′, Eighth St., cor. A St., n e; cost, $8,000.

Gen. Watmough, two-st'y brick stable, 18′ x 53′, Alley St., between Seventeenth and Eighteenth and H and I Sts., n w; cost, $2,000.

A. A. Stewart, 3 two-st'y and basement brick dwells., 13′ x 34′, Eleventh St., between Q and R Sts., n w; cost, $3,600.

Mrs. Carrie Burrill, two-st'y frame dwell., 14′ x 36′, County St.; cost, $2,300.

W. C. Dodge, three st'y and cellar brick dwell., 22′ x 38′, B St., between First and Second Sts., n e; cost, $5,000.

Joseph Lockey, two-st'y brick store, 20′ x 48′, cor. C St. and New Jersey Ave.; cost, $2,000.

R. H. Lansdale, two-st'y and cellar brick dwell., 22′ x 34′, Q St., between Fifteenth and Sixteenth Sts., n w; cost, $2,800.

J. L. Johnson, three-st'y brick dwell., 29′ x 32′ 2″, cor. Ninth St. and New York Ave., n w; cost, $5,500.

John Just, two-st'y and cellar brick dwells., 20′ x 34′, Seventh St., between M and N Sts., n w.; cost, $3,500.

General Notes.

Ansonia, Conn. — The soldiers' monument is to have a remodelled pedestal and a bronze statue, the cost being $25,000.

Bar Harbor, Me. — A large hotel is to be built by Boston capitalists for the next season.

Bath, N. Y. — Jail and sheriff's residence in course of erection for Steuben County: to cost $30,000; the jail portion fire-proof; Warner & Brockett, architects, Rochester, N. Y.

Bethlehem, Pa. — Carriage house and stable for Captain James Wiley, to be of brick and stone; Hazlehurst & Huckel, architects, Philadelphia.

Beverly, Mass. — Joseph W. Lefavour will soon build a costly summer residence at Hospital Point.

Brookline, Mass. — Mr. E. A. P. Newcomb of Boston is the architect of a house 40′ square now being built for H. S. Chase, Esq. First story of Roxbury stone and above of open-timber and plaster. Mr. W. H. Bowker, contractor; cost, $9,000.

Bryn Mawr, Pa. — Stone house for R. F. Kennedy; cost, $7,000; T. Roney Williamson, architect, Philadelphia.

Charleston, S. C. — Mayor Courtenay announces that arrangements have been perfected whereby the will of William Euston can be carried out, which bequeathed funds for the erection and maintenance of a hospital for the honest, aged poor.

Chautauqua, N. Y. — It has been decided to erect a two-st'y brick building for the use of the School of Languages.

Chestnut Hill, Pa. — New tower for Presbyterian Church; cost, $2,500; T. Roney Williamson, architect, Philadelphia.

Columbus, Ga. — Houses for J. W. Woolfolk and J. S. Garrett, and railroad offices and freight-depot, of brick and stone, 60′ x 550′; Bruce & Morgan, architects, Atlanta, Ga.

Dansville, N. Y. — Plans are being prepared for the "Home on the Hillside," to cost $156,000; six stories, absolutely fire-proof: Warner & Brockett of Rochester, N. Y., architects.

Decatur, Ill. — The corner-stone of the Masonic Temple, which will cost $25,000, was laid August 10.

Dubuque, Io. — W. L. Bradley, Esq., has begun a three-st'y store and office-building, "Peerless" pressed and moulded brick front; F. D. Hyde, architect.

Wm. Ryan & Sons have begun a two-st'y brick stable, 34′ x 40′, and a one-st'y office-building of brick, 32′ x 36′, pressed brick and terra-cotta front, adjoining their packing-house at the foot of Jones St.; F. D. Hyde, architect, furnishes the plans.

Edgewood, Ga. — House and cotton-seed oil mill, of brick and wood, for Edward Holland; Bruce & Morgan, architects, Atlanta, Ga.

Feehanville, Ill. — Proposals for the masonry of the north and south wings of the new St. Mary's training school for boys, at Feehanville, near Des Plaines, were received Saturday, August 26; G. Vigeant, architect, Chicago.

Fowler, O. — Addition and remodelling brick store-building; cost, about $3,000; for D. Harpster; N. B. Bacon, of Toledo, O., architect.

Grand Rapids, Mich. — Residence for Geo. W. Gay, Esq.; cost, $10,000; T. Roney Williamson, architect, Phila.

Hartford, Conn. — A $30,000 chapel of granite and in the English Gothic style is being built at the entrance of Cedar Hill Cemetery. It will be called the Northam Memorial Chapel.

Haverhill, Mass. — The new Catholic church, with seatings for 1200 people, is to be built on the cor. of Winter and Primrose Sts. The foundation is to be put in this autumn.

Holyoke, Mass. — Isaac Tirrell, chairman of the building committee of the Second Congregational Society received bids on September 7 for building a granite church at the cor. of Appleton and Maple Sts.

Jerseyville, Ill. — A Presbyterian church is to be built here; it is to be of Grafton stone, 50′ x 64′, in the main audience-room.

Lagrange, Ind. — The Presbyterians are building a new house of worship.

Lake, Ill. — Mr. O. J. Pierce, of Chicago, is architect of the new school-house to be built here.

Macon, Ga. — Houses for J. O. Wyner; Bruce & Morgan, architects, Atlanta, Ga.

Marietta, Ga. — Houses for Mr. Brannam and J. R. Brunby; Bruce & Morgan, architects, Atlanta, Ga.

Milton, Pa. — H. N. Swartz is about building a three-st'y block on Broadway. The front to be of Sutherland Falls marble.

Minneapolis, Minn. — It is the purpose of the Chamber of Commerce to erect a $125,000 building.

Munroe, Wis. — Mr. C. P. Randall, of Chicago, is the architect of the new school-house, which will cost $20,000.

Pawtucket, R. I. — The town has appropriated $40,000 for a new pumping-station at Happy Hollow.

Pittsfield, Me. — A town-hall, 70′ x 90′, of brick; cost, about $20,000.

Red Bank, N. J. — A cottage is to be built for Col. McClure: Messrs. Rossiter & Wright, of New York, architects.

Rochester, N. Y. — Hayden and Haven's building, corner of Exchange and Court Sts., furniture manufactory and warerooms; cost, $56,000; now in course of completion; Warner & Brockett, architects.

A commercial building for Mr. S. D. Walbridge, corner of State and Church Sts., six stories; to cost $45,000; Warner & Brockett, architects.

Rye Beach, N. H. — A new hotel is to be built in place of the Farragut house, burned last winter.

San Francisco, Cal. — The First Presbyterian Society has purchased a site for a new church on the cor. of Van Ness Ave. and Sacramento St. It is expected that the church will cost some $20,000 or $25,000.

St. Paul, Minn. — The cost of the new high-school house will be about $80,000; C. P. Randall, of Chicago, architect.

Taunton, Mass. — A frame house, 43′ x 60′, is being built for Mr. J. F. Montgomery. Messrs. Hartwell & Richardson, of Boston, architects.

Toledo, O. — Two-st'y frame dwell., on Ashland Ave., for Rev. Mr. Toensmeier; cost, about $4,000; E. O. Fallis, architect; A. Bentley, contractor.

Two-st'y frame dwell., cor. Twelfth and Oak Sts., for Mr. Leland; cost, $2,000; N. B. Bacon, architect; A. Lombard, contractor.

Two-st'y block, containing 2 dwells., Huron St., near Walnut St.: cost, $9,000; for Mrs. I. B Walte; N. B. Bacon, architect; J. Arnsman, contractor.

It is rumored that a very large union depot for Vanderbilt lines is soon to be commenced in the Fifth Ward, thus doing away with the present old depot at Island House.

Torrendale, Pa. — Presbyterian Church, of stone, to cost, $5,000; T. Roney Williamson, architect, Phila.

Ulysses, Neb. — Residence for Arthur Hale, Esq., 32′ x 36′ 6″; Hazlehurst & Huckel, architects, Phila.

Walnut Grove, Ga. — Brick house for S. H. Broadnax; Bruce & Morgan, architects, Atlanta, Ga.

Washington C. H., O. — A $100,000 court-house is to be built in Fayette County.

Wernersville, Pa. — Hotel building for Dr. Wolters, to be of stone, five-st'y; Hazlehurst & Huckel, architects, Phila.

West Chester, Pa. — Brick residence for M. R. Travilla, Esq.; cost, $7,000; T. Roney Williamson, architect, Phila.

Willimantic, Conn. — It is proposed to build a depot near the freight-house on Railroad St.

Industrial.

Belleville, Ontario. — N. W. Brown will build a storehouse for agricultural tools, 40′ x 75′.

Bristol, R. I. — The National Rubber Company is building a three-st'y brick factory, 50′ x 400′; Messrs. French & McKenzie, of Providence, are the contractors for the wood-work of this building, and Farrell & Cummings, of Pawtucket, for the brick work.

Another building, about 150′ long, and three-st'y, is to be erected immediately.

Chicago, Ill. — W. A. Furber, of this city, is the architect in charge of the building of Morden, Frog & Crossing's new establishment at South Chicago.

East St. Louis, Ill. — The Standard Oil Company of Pennsylvania will build large works.

Fitchburg, Mass. — The Star Worsted Company will double the size of their mill.

Hartford, Conn. — A factory for the firm of Smith, Bourne & Co. is now building, cor. Sigourney St. and Capitol Ave. It is of brick, three stories, 45′ x 130′ and 155′; cost, $50,000; Mr. John C. Mead, of Hartford, architect.

Holyoke, Mass. — The Newton Paper Company are to build another one-st'y stock-house, 45′ x 180′.

William Skinner & Son are to build a two-st'y boiler-house, 25′ x 33′, at their silk-mill.

Indianapolis, Ind. — Hetherington & Bernier are building an addition, 95′ x 300′.

Leland, Ill. — The Leland Fence Company are about to build a large addition.

Melrose, Mass. — The new rubber company will build 15 tenement-houses for the use of employés.

Milford, Mass. — Plans for the second factory of Estabrook, Wires & Co. are in preparation. The building will be 30′ x 85′, one-st'y, with monitor roof, with a section in the centre two stories.

Minneapolis, Minn. — Crocker & Pell are building large additions to their works.

Nashua, N. H. — The Jackson Company will build a new storehouse.

North Adams, Mass. — The Arnold Print Works are building a factory, 113′ x 255′.

North Attleboro, Mass. — The Gas-Light Company are building a new gasometer. Its cost will be at least $25,000.

Paterson, N. J. — Mr. Jas. Walder is about building a large factory in Queen Anne style.

Peabody, Mass. — N. H. Poor will build an addition to his shop, 30′ x 60′.

Rockford, Ill. — The Rockford Watch Company will enlarge their factory at a cost of $10,000.

Skowhegan, Me. — Keene Bros., of Lynn, Mass., will build a branch factory, 60′ x 200′.

South Chicago, Ill. — The Chicago Forge and Bolt Company will make an addition, 50′ x 60′, to their present works.

Toledo, O. — The Vulcan Iron Works is building a new boiler shop, 80′ x 100′.

Union Hill, N. J. — A brick silk-factory, 50′ x 100′, is to be built for Messrs. John Erskine & Co., of New York, from designs of Mr. Wm. J. Merritt, of the same city.

Westfield, Mass. — The Pierce Steam Heating Company, from Buffalo, N. Y., is building a 30′ x 60′ structure in the rear of the old foundry building of the Laflin Manufacturing Company, both of which buildings will be occupied by it.

COMPETITION.

Bronze Statue. [At Ottawa, Can.]

Ottawa, August, 1882.

The Government of Canada propose erecting in the grounds of the Parliament Buildings, at Ottawa, a bronze statue, nine feet high, of the late Sir George E. Carter. Parties are invited to submit models, two feet three inches in height, which must be accompanied with proposals for the bronze statue complete. A premium of one thousand dollars will be paid the party whose model and proposal is accepted. The models must be delivered at the Department of Public works, Ottawa, on or before the first day of January next. Copies of the conditions, etc., may be obtained on application at the office of the High Commissioner of Canada, No. 10 Victoria Chambers, London, S. W., England, and to the Secretary of the Department of Public Works, Ottawa, Canada.

F. H. ENNIS,

355 Secretary Department of Public Works.

PROPOSALS.

Bricks. [At Cincinnati, O.]

The Cincinnati Gas-Light and Coke Company will receive tenders up to noon Saturday, October 14, 1882, for five million bricks, to be delivered at "East End Garden," situated between Eastern Avenue and Ohio River, and Main and Spencer Streets, First Ward, Cincinnati.

One million to be delivered between January 1 and March 1, 1883.

Two million to be delivered between March 1 and May 1, 1883.

Two Million to be delivered between May 1 and July 1, 1883.

Each bid to be accompanied by specimens of the bricks to be furnished, which specimens are to be made the standard to which deliveries must conform, in accordance with the provisions of the specifications on file at Gas office, corner Fourth and Plum Streets.

A good and sufficient bond in the sum of $10,000 will be required, conditioned upon the faithful performance of the contracts.

Bids will be received for the whole lot, and also for separate deliveries.

The Company reserves the right to reject any and all bids. 354

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 352.

SEPTEMBER 23, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE people of Newport have been agitated for a week or two past on the subject of the sanitary condition of their city. A child of seven years died recently with symptoms which strongly suggested Asiatic cholera, and the disease was reported as a sporadic case of cholera by the attending physician. At a meeting of the local medical society on the day before the child was attacked some severe resolutions were passed, censuring the city authorities for the filthy condition of the town in general, and particularly of certain streets, and the outbreak within twenty-four hours of what was pronounced by three physicians in consultation to be the most dreafdul of all zymotic diseases gave special emphasis to the strictures of the society. The assertions of these and other medical men, that the condition of Newport was such as to invite Asiatic cholera, and that some portions of the city were as foul as the worst parts of New York or Boston, attracted the attention of the Newport Sanitary Protection Association, a body formed in imitation of those existing in Glasgow and other places in Great Britain, which first took the judicious step of inviting the opinion of Dr. Cabell of Virginia, President of the National Board of Health, upon the alleged cholera case, and then, after hearing his report, that although the symptoms and post-mortem examination were quite consistent with the theory of death from Asiatic cholera, he hesitated to pronounce it a case of the true epidemic disease, repudiated totally the imputations cast upon the healthfulness of the town. Meanwhile the physicians who made the first attack express their intention of following it up, and as the reputation of Newport for healthfulness is a matter of very great pecuniary interest to its citizens and real-estate owners, it seems as if the quarrel might become a long and bitter one.

AN interesting, and perhaps an important case is soon to be tried in Montreal. It seems that the by-laws of that city require the application of fire-escapes to all factories or hotels more than two stories high; but, as in so many other towns, this wholesome regulation is very feebly enforced, and among other buildings, the furniture manufactory of Azare Lavigne on St. Constant Street, which should have had a safety ladder, was allowed to remain without one until a certain day of last September, when it took fire and was destroyed. A certain sculptor, M. Louis Dion, was at work in the third story of the building, and having no proper means of escape suffered severe injuries from the flames. His face was scorched so that he has since lost the use of one eye entirely, and of the other partially, and besides the pain and disfigurement inflicted upon him, he was obliged to have recourse to medical and surgical aid to prevent even worse consequences. In his opinion the neglect of the city authorities to perform a duty which by the passage and promulgation of the ordinance they had publicly undertaken was one of the principal causes which led to his mutilation, and as an innocent citizen, who relied for his safety upon what the laws made for his guidance represented to him as the established order of things, and was deceived by them, and suffered in consequence, he now claims compensation in the sum of ten thousand dollars for what he has lost. To make matters still worse for him, it is said that on the day of the conflagration the members of the fire-department were away on a picnic, and the engines arriving on the scene very late in consequence, and without their proper attendants, failed to give that service which he, with the other taxpayers of the city, was required to contribute the price of, and had a right to expect. We should be very glad to think that M. Dion had any chance of recovering his ten thousand dollars, not only for his own sake, but to show other municipal governments that a responsibility rested upon them for the enforcement of the laws enacted by them; and that the politicians' artifice of promulgating wholesome ordinances to satisfy the opinion of the better portion of the community, and then dispensing with the execution of them for private reasons of their own, may prove to have sometimes unpleasant consequences.

A SO-CALLED "competition" of sculptors for the honor of executing the Lincoln statue in Chicago, for which a legacy of thirty thousand dollars was left by the late Mr. Eli Bates, has had a result which rather amuses the artistic public and probably does not disturb the peace of mind of the gentlemen who have the matter in charge. Some time ago the trustees of the estate invited four American sculptors to submit designs. Two of these artists reside abroad, one lives in New York, and the fourth in Boston. Of the American residents, one positively declined to enter any such contest, and the other withdrew before he had done any work for the trustees. This left the matter entirely in the hands of the two exiles, whose drawings have now just arrived and are in the Chicago custom-house awaiting examination. The trustees, according to the Boston *Herald*, will, when they get ready, inspect the designs, "and if either suits them will select it." "If not, they will call for new designs." What the distinguished American sculptors residing abroad will have to say to this arrangement we should be interested to know, but they might as well understand that it will make no difference what they think. The trustees, we venture to say, like others of their kind, understand perfectly well what they are about. They are put in their places to make the best trade in statuary that they can, — one that will bear the criticism of all their business acquaintances. The sculptors may make all the fuss they please about "good faith" and "sacrificing their valuable time on the understanding that the competition was limited," and so on. If they understood anything of the kind, that was their own lookout, and, besides, the time of a man who is willing to spend it in struggling after a small chance of a job cannot be very valuable anyway. Nor would these trustees, more than any similar ones, be likely to waste money on expert juries: their other business has probably always succeeded best when they have used their own judgment instead of some one else's, and although this might be, perhaps, a different matter, still, they undoubtedly know enough to tell a handsome statue when they see it, and at any rate, the advantage of keeping the reins in their own hands is one which they would not forego under any circumstances. If these are not the opinions of the Chicago trustees, they are at least those of most similar bodies, and the sort of sculpture which best appeals to such sentiments already adorns half the public pleasure-grounds in the Northern States.

THE New York *Times* of a recent date contains a discussion of the relative cost of lighting by gas and by electricity, which presents the most intelligent *résumé* of the subject which we have yet seen. According to this, the average electric-arc lamp produces a light far cheaper than that derived from gas, but of a character too glaring and unsteady for domestic use. The light of the incandescent lamps of Swan, Edison and Maxim is about five times more expensive for equal quantities than that from carbon points, and including interest on plant, costs about seventeen per cent less than the rate usually charged for the same illumination from gas. This comparison, however, holds good only where electricity can be furnished on a large scale, as in the New York districts, and as gas can be manufactured at a price far below that at which it is now sold, it would seem that it had still a certain advantage in the rivalry which is springing up between the two systems. In fact, as the *Times* says, Mr. Edison, who is one of the most prudent of men, acknowledges this, and it is to meet the difficulty that the Edison Company has arranged to supply motive

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power in connection with light in all its districts. In this business it has nothing to fear from the competition of the gas-companies, and little from that of the new steam-power corporations, and if it can sell motive power at a profit in the day-time, it can well afford to keep its engines running to supply light in the evening, at a small loss, if necessary, on the actual cost.

A singular misfortune has occurred to a small church in Andover, Mass., which seems to be in process of being eaten up bodily and swept away. The church was erected about six years ago, and is finished with what is said to be ash, but has more the appearance of chestnut, which often closely resembles the coarser kinds of ash. A year or two after its completion the sexton noticed little heaps of dust on the carpet near the walls. These grew more and more frequent, and appeared in various portions of the building, so that they had to be gathered up regularly every week, and on searching for their cause the wood of the base-boards and portions of the pews was found to be completely riddled with holes made by small, round, black or blue worms, the débris of whose borings fell out occasionally upon the floor in the form of dust. Unlike most boring worms, this species seems not to object to the taste of varnish, for the polished surface of the wood is pierced in thousands of places. The stock was regarded as completely seasoned and in good condition when put into the building, but it would seem that it must have contained the embryos of the insects, for the finish of the galleries is attacked equally with that of the ground floor. If any of our readers have met with a similar case we should be pleased to receive an account of it, and if any know of a remedy, the trustees of the church would be glad to avail themselves of it.

An interesting expedient was successfully used for laying the foundations for the new dry-goods store, the "Printemps," now building in Paris on the site of the one destroyed by fire last year. The new structure is to be entirely fire-proof, and although the disposition of the upper stories made it advisable to plan the foundation in a series of piers, it was necessary to make these piers very firm, and carry them down to a stratum of unquestionable solidity. The ground under the site was, however, of a character very ill adapted for deep excavation. It was a loose sand, saturated with water, and although the firm rock was found about six feet below the water-level, any removal of the sand for trenches was sure to be followed by caving in of the sides, and very probably by the under-mining of the adjoining buildings. It was therefore decided to employ for depositing the piers a modification of the caisson and air-lock now used in bridge-building. Tubes of sheet-iron, six to nine feet in diameter, and about six feet long, were provided, in number equal to that of the piers to be constructed. Each of these had at the top a projecting flange, by which it could be bolted to a hollow cone, also of sheet-iron, the joint being made tight with india-rubber. This cone had a man-hole door at the top, fitting air-tight, and over it could be placed a second cone, which was bolted to it, and also had an air-tight door. The space between these two cones formed the air-lock. The caisson-tubes were first placed in position, and the double cone was set up over one of them, and when all was made tight the workmen placed inside began to excavate under the rim of the tube. As this sank by its own weight, air was pumped into the cones in sufficient quantity to force back the water which would otherwise enter beneath, and the laborers thus worked in dry ground until the caisson had sunk to its hard bed. The excavated material, instead of being thrown out, was deposited in the bottom of the air-lock, occupying the narrow space between the lower part of the outer and inner cones. When all was excavated, a "béton tube" consisting of a small separate air-lock, with double doors, was attached to the man-hole of the upper cone. This was alternately filled with concrete through the upper door by workmen outside, and emptied into the bottom of the caisson by men stationed in the air-lock between the two cones, who opened the door of the lower cone simultaneously with the lower door of the béton tube. The laborers in the caisson spread and rammed the concrete as it fell, until the pier was complete; then they ascended to the outer air, the bolts were loosened, and the béton tube and the upper cone were lifted off. The removal of the upper cone allowed the excavated material, which had been deposited in the bottom of the air-lock, to slide quietly off on all sides, and the inner cone was then lifted and carried away, to be replaced on top of the next caisson. This ingeniously simple contrivance answered its purpose admirably, and the time occupied for building each pier, including all the adjustments of the cones and tubes, was only about twenty-four hours.

The city of Keene, New Hampshire, has adopted what is called the Memphis system of sewerage, and has contracted with the Drainage Construction Company of Boston to carry out the plans made by Mr. George E. Waring, Jr., for a system comprising between twelve and thirteen miles of public drains. The contract price is eighty-two thousand dollars, and the whole work is to be completed before the end of the present year. We presume that, as at Memphis, Field's siphon-tanks will be placed at the heads of the lateral drains, for flushing them out, and it will be interesting to see whether they can support the severe winter climate of New Hampshire without harm. The only objectionable feature of the enterprise seems to consist in the choice of an outfall into the Ashuelot River. It is true that this stream is not now so pure that a little additional defilement would injure it much; but if our rivers are ever to be restored to their natural wholesomeness, some one must make a beginning of keeping filth out of them.

The New York *Tribune*, urged by the rapidity of the process of degradation which is going on at Niagara, publishes an appeal to all Americans, particularly to American women, to make a combined effort to rescue the great cataract from its impending fate. What form the endeavor is to take, whether that of raising subscriptions to purchase the property of the riparian owners, or of an irresistible appeal to the State or Federal authorities to take possession of the territory, we are not told; but our confidence in the success of the undertaking, in whatever form, is not unbounded. It is said that Lord Lorne is in favor of the project of forming an international park about the Fall, and the shore on the Canada side being as yet almost in a state of nature, the expense of acquiring and beautifying it would be comparatively small, so that if American enthusiasm should prove unequal to the task of saving its own portion of the cataract, it might still contribute with advantage to secure the future attractiveness of the Canadian half. Fortunately, also, the Canadian or Horse-shoe Fall is incomparably grander than the other, and with that undisturbed by the mechanism and filth of civilization, we might perhaps be content to leave the American Fall to the rag-pickers and tub-makers.

An important movement has been developed among the iron-workers of Pittsburgh, which within a single week has terminated the long and desperate strike in that trade, and bids fair to destroy the Amalgamated Association itself, to the decided benefit of the community at large, and not less of the workmen in iron. It seems that the manufacture of iron and steel is carried on in the mills by gangs of men, comprising puddlers and laborers, and finishers or rollers, who are highly skilled operatives and direct those associated with them. The number of rollers or finishers is small in comparison with that of the inferior workmen, and as they command high wages, which they have been obliged through their loyalty to the Amalgamated Association to forego for many weeks, it seems to have occurred very recently to some of the more thoughtful among them to inquire what benefit they were likely to derive from the strike. The question once raised was pursued farther, and it was soon obvious that their enforced idleness was for them simply the throwing away of so many dollars a week for the benefit, primarily, of the salaried officers of the Association, whose influence and importance depended upon the sheep-like docility with which their behests were obeyed throughout the trade, and in the second place, for the doubtful advantage of the lowest and most numerous class of workmen. Even among the general body of operatives the folly of such conduct was soon evident, but the executive committee refused to countenance the least departure from their dictates, until at last the finishers revolted in a body, and forming a society of their own in anticipation of their expulsion from the Amalgamated Association, returned to their work in the mills, to be followed immediately by all the more sensible of the other men, with the officers of the Association bringing up the rear, explaining in their usual style the entire harmony of all the proceedings with their intentions and wishes, and their willingness to continue their valuable services under all circumstances.

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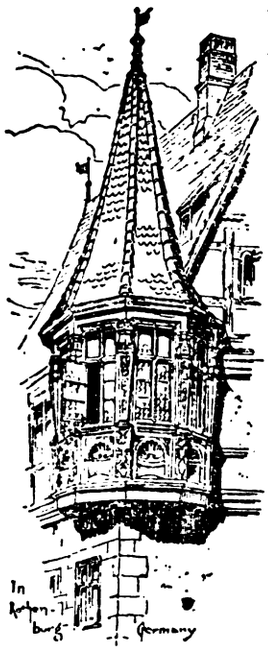
FROM BAYREUTH TO RATISBON. — NOTES OF A HASTY TRIP. — I.



EARLY in August we left Dresden for Bayreuth. It is hardly necessary to say what our object was, nor is this the place to dwell upon Wagner and his festival. Thence we were to go to Nuremberg — partly for the Bavarian Industrial Exhibition there holding — and southward to Munich. We were due in Dresden again in two weeks' time, so had but few hours to spare for anything beyond the main objects we had in view; but the towns which lay along our path, or but little to one side, are so interesting that we determined to get at least a hasty glimpse of them. With but one exception they are well known by repute to all architectural students, for their main attractions are referred to in all the "books." Bamberg, Nuremberg, Würzburg, Ratisbon, are so famous architecturally that there may seem little excuse for further description of them, especially by a mere amateur tourist, and one, moreover, who was so pressed for time as to get but a glimpse at their manifold contents. Yet there is one disadvantage in studying only works on architecture proper and taking their descriptions as a guide in one's pilgrimages. Too often they describe what has been rather than what now is visible — tell us what was to be seen in the days of the early Hohenstauffens or of Charles the Fifth, but give little indication as to the condition in which cities and churches now remain. Desecration and restoration have laid their hands on many of the most famous monuments of the past, wreaking such mutilation that a pilgrimage in their direction ends in woful disappointment, while on the other hand many monuments of less note and originally of less importance and charm are so much more nearly in their first condition that they more amply repay inspection. Then the technical treatises usually take small account of the minor treasures which abound in many buildings — the sculptures, carving and glass which are often as delightful and instructive as their architectural features proper. In my own case, I know, during the brief trip to which I refer, disappointment often came where the books had predicted most, and delight where they had said little or nothing to prepare for it. It may be that in coming summers one or two of my readers may be drawn to Bayreuth. I hope it for their sakes, and may counsel at the same time that they should visit these neighboring towns, — wishing only that they may have more time to study them than was granted me.

Western Bavaria is particularly interesting to the architectural student, for it was the centre of German life through so many centuries that its towns are filled with the relics of every period, from the earliest Romanesque down to the latest Rococo days. This fact has led, it is true, to the partial ruin of many of the oldest and most interesting structures; for in places where the current of life and activity remained strong throughout the seventeenth and eighteenth centuries as well as through those which went before, the heavy hand of the Jesuit Fathers was laid on almost every ancient work, bringing it more or less into conformity with their ideas of beauty and fitness; but the student of art in general and not of some one period in particular will often find, in the traces of many ages and of many different ways of thinking and of feeling, an attraction which mitigates in some degree his rage at the *baroque* redecorators of Romanesque and pointed buildings. In many cases, moreover, the traces of their alterations have been removed in quite recent days, while their original works remain and are often picturesquely if not architecturally valuable. There are districts, of course, in which the best periods of Christian art may be more advantageously studied than in this portion of Bavaria; but I know of none where the student can so readily get, at one glance so to speak, a survey of every style and manner of working, from the very earliest down to the very latest, when architecture was a living, developing, if sadly decadent art. Another interesting fact about this region is the extremely varied character of the different towns. An hour's ride in the train takes one to a city which is not the counterpart of the one just left, — as would more or less truly be the case in almost every country, — but to a place in the strongest contrast with it, both in its general architectural character and its present condition as an abode of contemporary men. Würzburg and Ratisbon, for example, the tourist is apt to picture to himself as similar in their general aspect, while the fact is that no two cities could well be more diverse in every way. Bamberg is quite unlike either, Bayreuth again very different, and Rothenburg is a thing apart and quite by itself — a town the like of which, so far as I can tell, there is not in all Germany. To begin with the beginning, we have in Bayreuth a little, quiet, not especially picturesque town, with few relics of early days, and until Wagner made it a centre for thousands of pilgrims, almost forgotten by the outside world and almost destitute of all activity: its chief buildings date from the last century only. Then a couple of hours' journey brings us to Bamberg, where one sees Romanesque art in all its glory and in an admirable state of preservation, together with some fine Renaissance buildings. There is more evidence of contemporary activity, and more to tell of various other centuries than in Bayreuth; but it remains as truly typical in its chief structures of the twelfth and thirteenth centuries as does the latter of the eighteenth. After this we expect to find in Würzburg something of the same sort — another shelved relic of former days, shut out from the main current of modern life; but to our surprise we find it bustling, gay and lively, a thoroughly vivid and modern town. In place of deserted, quiet streets, we see crowded market-places, brilliant shops, and throngs of alert, well-dressed, quite metropolitan-looking people; and architecturally it is the greatest hash — there is no other word — one can well imagine. Not only do buildings of every period abound, but every structure has been rebuilt and restored, and redecorated, and patched, and added to and conjured out of its original form and meaning till the eye becomes wearied and the brain confused trying to imagine what its original aspect may have been. But the want of purity and completeness is almost atoned for by a kaleidoscopic variety which for once is amusing, if not particularly instructive; and there are, moreover, few places so rich in minor art, especially in splendid iron-work, as Würzburg. Then going off the main track we make our journey to Rothenburg on the Tauber. Here I have no apology to make for giving my hasty comments, for this wonderful little town is almost unknown to the outer world. One or two of its buildings are, it is true, mentioned in a casual way in Lübke and other architectural writers, but no hint is given as to its unique attractiveness, and the guide-books which point the feet of the average student do not even mention it. I hope I shall excite my readers' interest a little when I say that it is an old walled town, full of late Gothic and Renaissance structures, scarcely touched by later builders, and giving the most perfect existent picture of an old German city as it appeared in the days of its renown. A fuller description of it must stand over, however, until we reach its gates in the regular course of our little trip. Thence we go back to the main road and on to Nuremberg. Here it is hardly necessary to say what awaits the tourist; but those who may have visited it in former years will surely be surprised by the changed aspect it wears to-day. I was there some ten years ago and knew very well that it had grown immensely in wealth and activity and commercial importance in the interim, but I was astounded at the change. There is no cause for alarm: its old buildings have not been interfered with to any extent, and in the way of minor art-treasures its attractions have been vastly added to; but whereas it was not long ago a quiet, dull, half-dead looking city, living all in the past and not at all in the present, it is now flourishing, active, with crowded streets, and on every hand the evidence of wealth and prosperity — *the* centre of many of the manufactures and semi-artistic industries which have so raised Bavaria's commercial reputation during the past few years.

Passing on to Munich we find a town which is completely modern and in the worst possible fashion—surely the ugliest, most ambitious yet characterless and uninteresting on the continent, the most painful to the eye of the architect or the lover of architecture in any form. One stays in it solely for the sake of what its ugly buildings hold, and shakes the dust off one's feet in the anticipation of finding something pleasanter at Ratisbon—or Regensburg to give it its proper name. I had been so often surprised, as I have said, during this and other trips in Germany that I did not know exactly what to look for — whether a modernized city like Würzburg or a quiet, peaceable, thoroughly German town like Bamberg; but it was neither of the two. Its narrow, crooked streets, with houses that were not new but had almost lost their original semblance through frequent coats of paint, looked more like those of some Italian town than like anything I knew north of the Alps. Its churches were legion, some in comparatively admirable condition like the Cathedral, others "Jesuitized" like those of Würzburg, and others, again, fallen into neglect and ruin, and prostituted to the most alien purposes. Its streets were full enough of people (at least on the Sunday which saw our visit), but all seemed of the lower classes and of particularly provincial aspect. There was neither the rush of modern activity to be felt nor the peaceful, dreamy, gone-to-sleep-and-don't-care-to-wake-up mood of such cities as Bamberg and Bayreuth. In their place a gloomy, sinister, dogged sort of temper seemed to breathe from its dark streets—a temper as of some discrowned king sulking in gloomy obscurity. When we remember that Regensburg is, in truth, such a discrowned monarch among cities, we forgive its sullenness; but that does not help to lift the weight it lays upon our spirits. Only inside the beautiful cathedral do they rise again,—and here comes a fresh surprise, for the "books" do not prepare one for all that is to be found there. But my introductory chapter is far too long already. It may serve, however, to illustrate—though most incompletely on account of its brief list of towns, the great diversity to be found within a narrow compass in this Bavarian region. Many other towns, equally diverse and interesting, lie close about those I have noted, and the tourist who travels in the track which leads to these cannot fail to find something worth seeing no matter where his feet may pause or his eyes may rest. A walking tour through this part of Bavaria would be most instructive. Only by some such means, indeed, could

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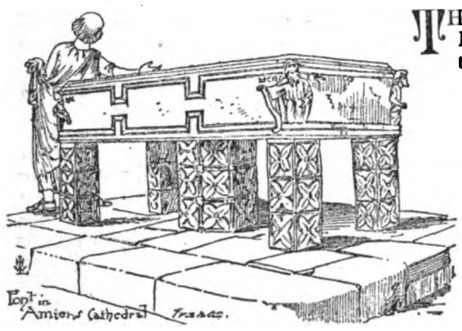
one get to know its art,—for the tiniest village often holds something as well worth studying as is found in its larger neighbors.

M. G. van Rensselaer.

LE MUSEE DE SCULPTURE COMPAREE, PARIS.



THE object of the Musée de Sculpture Comparée, just opened at the Trocadéro, is to place before the public, by the aid of casts, a complete history of the development of art from the earliest to the present time, the examples being so classified as to convey this idea to the simplest minds. The late M. Viollet-le-Duc, who was the originator of the plan, thus explained it: "The art of sculpture is divided into three periods: imitation of nature by a more or less intelligent and refined interpretation; the Archaïc period, during which special types were fixed upon and adhered to; and the period of emancipation, the search after truth of detail, and the perfecting of means of observation and execution. All nations have not entirely fulfilled this programme. Some have passed through all three phases of this development; some have only accomplished the first two, and have not passed the hieratic period: as for instance, most of the Oriental nations, the ancient Egyptians, and the Byzantines. There is a striking analogy between the sculpture of these two epochs, just as we find a strange likeness between that of the Eginetic or Archaïc period of the Greeks and the Archaïc period of the twelfth century in France. In the same way one finds most interesting forms of analogy between the development of sculpture amongst the Greeks from the time of Pericles and in France in the thirteenth century."

Again there is a curious resemblance between the French twelfth-century work and the Egyptian of the Archaïc period: that comprised between the sixth and eighteenth dynasty, as also between the sculptures which date after the time of Phidias and the French ones of the thirteenth and fourteenth centuries. Thus, a statue from the principal door of Chartres Cathedral, placed near a hieratic Greek figure, appears to have been fashioned in the same school, by the manner of interpreting nature, by the conception of type, and by the execution. These great principles will be clearly shown when the museum is completed: at present most of the care of the organizers has been to illustrate the transformations of the French school of sculpture.

In architectural sculpture eleven schools are represented: those of Cluny or Burgundy, Provence, Saintonge, Ile de France, Champagne, Normandie, Picardie, Périgord, Languedoc, Auvergne and Poitiers. In sculpture, strictly speaking, the different characteristics are less striking; certain schools dominate, as for instance that of Provence, which merges into those of Périgord and Languedoc. During the twelfth century the sculptors of the Ile de France and of Champagne were superior to all others; but there came a change. The lay element crept in, hieratism was abandoned, architecture forsook monastic traditions and entered upon a new phase, — that of the study of nature, — a transition of the same kind as had taken place amongst the Greeks. From that period the schools intermingled, and since the fifteenth century only two have existed in France, viz.: the purely French and the Burgundian, which was strongly impregnated with Flemish elements.

In the first hall of the museum the visitor becomes acquainted with the début of the French school in the eleventh century. At that time an enthusiasm siezed the nation to build and embellish churches and to decorate them in such a manner as to educate the people in the mysteries of religion. Hence over the principal doorway was generally placed a Last Judgment, that upon entering the church all might be reminded of death and eternity, and so be admonished to live a good life and escape the torments of hell, so graphically placed before their eyes. At the Trocadéro are several such compositions: notably one from the Cathedral of Bourges and another from that of Autun. In this latter God the Father is sitting in the centre; on his left are an angel and Lucifer weighing the souls of men in a balance; above are the judges. The souls belonging to the demon are siezed by devils issuing from a sort of box. On the right hand are the redeemed rejoicing in their state of bliss, Paradise being represented by another little box, into which the elect enter by a small hole in the lower part. At the lintel is an angel who separates the good from the wicked; these latter, being clutched by great hands and tormented by the demon who thrusts them into hell, give vent to tears and lamentations, while the elect rejoice in their happiness and sing praises to the glory of God. All this is naïve and primitive, but it is not wanting in character or pathos.

The doorway of the Cathedral of Vézelay is also very remarkable: it represents God in glory surrounded by saints. Below are what appear to be the seven deadly sins, but it is not very clear. Still what can two old men hugging coffers represent if not avarice? And the pig-headed personages must surely be intended for gluttons. Above is a scene familiar to every one in the middle ages — people bringing gifts of money and kind to the church and receiving their reward in the promise of the joys of heaven, while others who refuse any oblations are seized by devils and damned eternally in the flames of hell. These and the like were all subjects intended to help the people so to live that they might die well and thus escape the terrors of the infernal regions. Nothing was omitted: the joys of heaven were shown them as things to aim at; the horrors of hell as things to fear and dread. There was no mean between these extremes.

As one advances to the thirteenth century the style of decoration widens in idea and approaches more to nature; while during that century the change is so rapid that it almost amounts to a revolution. The people of France began to assert themselves, and they even attained certain rights, — few, it is true, but still there was an advance towards liberty of thought, and with that advance there was a desire to instruct themselves. Moreover the nation was just then, as an old historian remarks, "devoured with a desire to build." The edifices of the Romans, the Goths and the Franks were found heavy and clumsy; a wish for something lighter and more elegant seized the public mind, and so ogival architecture was perfected and a more thorough imitation of nature in sculpture was aimed at. Form was more carefully studied, expression was sought after, and drapery was made to represent the movement of the body beneath it. As examples of this development casts can be studied from the cathedrals of Reims, Amiens, Autun and Chartres, and the churches of Notre Dame de Corbeil, St. Pierre de Moissac (with its exquisite cloisters), and St. Madeleine de Vézelay; also a façade from Amiens, of the Blessed Virgin and the Infant Saviour surrounded by the twelve apostles, and another from Reims, a bas-relief of the decapitation of a martyr-bishop. This is very curious and dramatic: a woman lifts her hands to heaven to call witness to the crime just committed by the soldiers, while on the opposite side is the head of the bishop reposing upon the altar. Here again the composition is naïve, but the workmanship is excellent. From St. Pierre-sous-Vézalay is a fine figure of an old man in a long beard, of the thirteenth century; the central part of the western façade of the Church of St. Etienne, at Auxerre, thirteenth century, the figures of which are unfortunately much destroyed; the doorway of the cathedral of Chartres, representing God surrounded by the four evangelists and their emblems; the doorway of Notre Dame de Paris (the Resurrection); the figures which ornament the southern side of the Cathedral of Chartres; part of the base of the cathedral of Amiens, on which are the signs of the zodiac; the splendid columns of the cathedral of Chartres and a doorway from the same church supported by statues forming columns; some capitals of columns from the cathedral of Reims; the curious galleries of the choir from the cathedral of Laon, and several remarkable sculptures from the cathedral of Amiens.

At the Trocadéro all these can be seen and studied: the elegant traceries of the windows, the wonderful designs which ornament the capitals, the transition from the round to the pointed arch, and the development from the rigid and traditional to the free and natural styles of decorative art.

It is rare that any traces of a foreign manner are found in France, still in the southern towns buildings remain which show signs of having been the work of foreign workmen—probably Greek artists from Arles which was at that time a rich city holding much intercourse with the towns of Italy. Some of these workmen journeyed as far north as Paris, and probably the bas-reliefs which ornament the west wall of Notre Dame, between the great central and the north doors, are by them. Again in the façade of St. Trophime at Arles, finished in 1152, there are reminiscences of the antique; and no doubt the doorway of the church of Moissac is also of Greek workmanship. Here again is the usual subject slightly modified — Jesus Christ is seated in glory, holding the book of the seven seals in one hand and giving the benediction with the other, surrounded by the four evangelists with their emblems. Below sit the four-and-twenty elders of the apocalypse listening in wrapt attention to the result of the judgment. The grandeur of the heads, their divine expression, and the elegance and richness of the drapery, prove this composition to have been the work of skilled artists.

In early times it was the custom to honor the dead by magnificent sarcophagi ornamented with statues and bas-reliefs. Those of founders of churches, or abbots, were composed of figures of Religions weeping over their benefactors and the members of their families. Later on a kind of marble table or slab raised two or three feet above the ground was substituted for the sarcophagus. This was generally sustained by little pillars, and upon it was laid the effigy of the departed as he appeared upon earth, dressed as a warrior, a priest, a bishop, or abbot, as the case might be, while underneath was another effigy reposing in the sleep of death. In this style are tombs of Estienne d'Aubaguines; the children of Charles VIII by Jean Juste, at Tours; François II, at Nantes (the figures at the corners represent the four cardinal virtues, Fortitude, Temperance, Vigilance, and Justice; and it is a curious fact that at the present time at a first-class funeral in Paris these same allegorical figures in plaster are placed at the four corners of the catafalque); Louis XII and Anne de Bretagne, his wife, at St. Denis; Henri II and Catharine de Medici, by Germain Pilon; and Philippe and Ulric de Werth,

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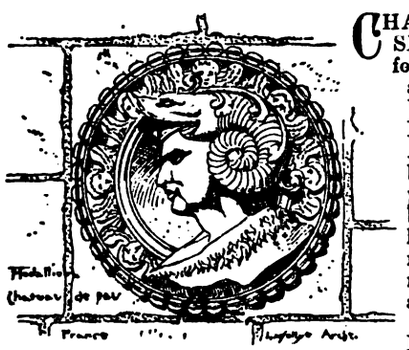
landgraves of Alsace, at the church of St. Guillaume, Strasburg. The feet of this last one rest upon dogs, a very common device in those times, either emblematical of fidelity, or of the success of the defunct in stamping upon the evil one. Here, too, is the celebrated "Puits" or "Well of Moses," which was formerly in the old Chartreuse of Dijon, now rebuilt as a hospital for the insane. It was executed by Claus Slater (the sculptor of the tombs Philippe le Hardi, and Jean-sans-peur, also formerly in the Chartreuse), supposed to have been a Dutchman. The dates of the tombs being 1342–1419 it is probable that the well was executed about the same period. It consists of figures of Moses, David, Jeremiah, Zachariah, Daniel, Isaiah, placed under rich canopies and upon pedestals. It is hexagonal in form, and remarkably fine, particularly the expression of the faces: indeed Slater was celebrated for his truth to nature, as is exemplified by an anecdote related of François I, who on visiting the Chartreuse and seeing the tomb of Jean-sans-peur, and the gash in his skull, remarked, "Through that the English entered France." The figures from the Fontaine des Innocents, by Jean Goujon, should not be passed over although they are of much later date.

Rarely are the names of the artists recorded upon old work, probably from a modest feeling that being purely religious in object, it was of no consequence knowing by whom the work was done—a species of modesty that is very conspicuous by its absence in these latter days; but nevertheless it is to these obscure workers that every country owes its early artistic education; it is to these naïve instructors that we must be grateful for the cultivation of our tastes; it is to them that we owe our love of the beautiful and true in art; and it is their work which has helped to form such men as Michel Colomb, Jean Texier, François Marchand, André Colombeau (of Dijon), Jean Juste (of Tours), Jean Goujon, Germain Pilon, and Bontemps.

PENGUIN.

DR. CHARLES WILLIAM SIEMENS.



CHARLES WILLIAM SIEMENS, D.C.L. of Oxford, LL.D. of Glasgow and Dublin, Ph.D. of Würtzburg, is this year President of the British Association, and it will be appropriate at the present time to refer briefly to some of the leading points in his career which has been in many respects a remarkable one.

Dr. Siemens landed in England when nineteen years of age, with little money in his pocket, without friends, but with plenty of confidence of ultimate success. He came to this country from Germany with an invention, the work of himself and his elder brother, who, as Dr. Werner Siemens, has since become so widely known. This invention related to improvements in electro-plating, and was taken up by Messrs. Elkington & Mason, of Birmingham, who thus gave young Siemens his first start in life. He went back to Germany, but returned the following year with a chronometric governor worked out with his brother. This, though less successful from a commercial point of view, brought him into contact with the engineering and scientific world, and determined him to make England his home. The chronometric governor has since been applied by Sir George Airy for regulating the motion of his great transit instrument at the Royal Observatory, where it is still employed. Mr. Siemens was just over twenty-one years of age when Faraday chose for the subject of a Friday-evening lecture the "Anastatic Printing Process of the Brothers Siemens."

During the next ten years he was variously engaged, but mainly in matters connected with mechanical engineering: he improved his chronometric governor, brought out a double-cylinder air-pump, and a simple water-meter, which has been very extensively used in this country and abroad. He then turned his attention to the new study of the dynamical theory of heat and the employment of regenerators for recuperating the heat generally allowed to run to waste. His first application was to a regenerative steam-engine he constructed in the factory of Mr. John Hicks, of Bolton, and although an engine of this character was exhibited later on at the Paris Universal Exhibition of 1857, the use of superheated steam was attended with difficulty, and the application of the regenerative principle to motor engines has not so far been extensively made. The Society of Arts, however, acknowledged the value of the principle by giving Mr. Siemens the gold medal for his regenerative condenser in the year 1850.

In 1855 he presented his first paper to the Institution of Civil Engineers, "On the Conversion of Heat into Mechanical Effect," which gained him the Telford premium and medal. During the decade thus commenced, that is between his thirtieth and fortieth years, he described his governor, steam-engine and water-meter in papers read before the Institution of Mechanical Engineers, and read two papers on electrical subjects, one before the Institution of Civil Engineers, on the tests employed during the construction of the Malta and Alexandria Cable, and on insulating and protecting sub-marine cables; the other on the electrical resistance and electrification of insulating materials under pressures up to 800 atmospheres, which was published in the British Association Report for 1863. Five years previously he established with his brothers, Dr. Werner and Mr. Carl Siemens, the firm of Siemens Brothers, which has since become famous as well for the electrical instruments and machines they manufacture as for the sub-marine and land lines due to their enterprise, four transatlantic cables, the Indo-European line, as also the North China cable, the Platino-Brazileira cable, and others.

It was during these ten years that he was engaged with his younger brother, Mr. Frederick Siemens, upon that invention with which his name has since been mainly connected, the regenerative gas-furnace. All heat furnaces formerly discharged, and a great many unfortunately still discharge, the products of combustion at a very high temperature and in an incompletely consumed state. The first of these evils was cured by the regenerative furnace using solid fuel in the combustion-chamber. A quantity of brickwork was so arranged that the hot products of combustion could freely pass through it in one direction, thus heating it on their way to the chimney, while cold atmospheric air passed through it in the opposite direction, absorbing heat from the heated brickwork, and being raised in temperature before being supplied to the fuel on the hearth. The second cause of waste was checked by turning solid into gaseous fuel, and then by means of double regenerators heating the gas and air respectively before they combined in the combustion-chamber of the furnace, to which they were supplied by valves in the necessary quantities to allow of complete combustion.

With the regenerative gas-furnace Mr. Siemens, in 1862, attacked practically the problem which in 1722 Reaumur had solved experimentally, by making steel through the fusion of malleable iron with cast-iron in a clay crucible. He also commenced his work with crucibles, but soon discovered that with the enormous quantity of high-temperature heat at his disposal in the regenerative furnace it was a waste of energy to melt steel in such small quantities. He endeavored to interest iron-masters in his invention, but had eventually to experimentalize on his own account at the Sample Steel Works at Birmingham, where, after seven years had passed and much money had been expended, he introduced what is known as the open-hearth or Siemens process, in which pig-iron is melted on the furnace bed and iron ore then added in the proportion of from 20 cwt. to 24 cwt. to 5 tons of pig-iron, and with M. Emile Martin, the Siemens-Martin process, in which scrap-iron takes the place of ore. In 1867, at the Universal Exhibition of Paris, he was awarded a Grand Prix for his regenerative gas-furnace and steel process. After his success at Birmingham the Landore Siemens Steel Company was started and now produces 1,000 tons a week of that tough soft steel of specially high quality which Dr. Siemens has been largely instrumental in introducing for the manufacture of ships and boiler-plates, tyres, and for like purposes, where a material of high endurance is required. Upwards of 340,000 tons of this material were made last year in 150 furnaces at different works in the United Kingdom, such as those of the Steel Company of Scotland, Vickers & Co. of Sheffield, the Parkhead Forge, and others.

During this decade was also introduced the rotary furnace for producing iron direct from the ore instead of by puddling pig-iron. A very good quality of iron has been made by this method, which is now mainly used as a feeder to the open-hearth process.

During the last ten years Dr. Siemens and his firm have devoted much attention to the practical application of electricity. In 1867 he brought before the Royal Society, on the 14th of February, a paper containing the results of researches by himself, based on a conception by his brother, Dr. Werner, on the conversion of dynamical into electrical force without the aid of permanent magnetism. By a very curious coincidence Professor Wheatstone's paper on "The Augmentation of the Power of a Magnet by the Reaction thereon of Currents induced by the Magnet itself," was also read at the Royal Society on the same evening.

Another invention of Dr. Siemens which deserves special notice is his electric resistance thermometer and pyrometer. As early as 1860, when engaged in superintending the electrical examination of the Malta and Alexandria telegraph cable, his attention was directed to the increased resistance of metallic conductors due to a rise of temperature, and in 1861 a thermometer, the action of which was based on this fact, was described by him before the Physical Section of the British Association at Manchester. Later on Dr. Siemens further investigated the subject, the result being the production of his electric resistance thermometer and pyrometer, which has been the means of affording material aid to certain branches of scientific research. This instrument formed the subject of the Bakerian Lecture for the year 1871, and upon it has been founded Professor Langley's recently invented "bolometer."

Five years ago, when Dr. Siemens brought before the Iron and Steel Institute his proposal of great power centres for driving either by means of natural sources of energy or large and powerful engines, dynamo machines for supplying light and power over areas of sixteen square miles, only a few accepted the possibility of such a consummation, and yet now the Government has brought in a bill to effect a similar result.

Dr. Siemens has been President of the Institution of Mechanical Engineers, twice of the Society of Telegraph Engineers and Electricians which was founded under his auspices, and of the Iron and Steel Institute. Oxford in 1870 made him a D.C.L., while Dub-

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lin only a few months ago, and Glasgow in 1880, conferred on him the degree of LL.D., and more recently still, the University of Würtzburg bestowed on him its honorary Ph.D. Dr. Siemens is member and honorary member of many European and American societies, while he has received recognition of his services to pure and applied science from the Emperor of Brazil, the Shah of Persia, and from France, both under the Empire and Republic. — *Engineering.*

THE ILLUSTRATIONS.

RAMBLING SKETCHES BY MR. T. RAFFLES DAVISON. — LLANBADERN CHURCH, WALES.

[From the *British Architect.*]

ONE of the most solemn and severe-looking old gray churches to be seen is the old Cathedral of Llanbadern Fawr. This fine old Welsh church, with its great central tower, is a picturesque object from many points of view, as it dominates the little village of Llanbadern, nestling on the hillside of the Ystwith valley. The church was greatly in need of restoration, and this has been, in part, taken in hand, under the direction of Mr. J. P. Seddon, of Westminster, in an admirable manner, no points of interest in the old work having been lost. The treatment of the tower crossing inside is unusually fine and dignified. Mr. Seddon has put a boarded barrel roof over the nave, with bosses on the ribs, similar to the old dilapidated roof which is shown in my sketch as now existing in the chancel. The singular feature of the exterior is the tower, forty feet square, with the regularly disposed square holes over all its sides. If the restoration funds permit the covering of this by a lofty plain spire, with louvre openings for the bell sound, as Mr. Seddon suggests, the effect of the whole will be splendid. The pulpit is the gift of the present Bishop of St. David's, as a memorial of his mother. The lectern I have not seen one like before. It is a combination of stone and faïence. Leaving out of question any difference of cost between carving of stone and modelling of clay, the advantage this faïence possesses is the excellent coloring in which it may be produced. The light blue-gray of this eagle, which is emphasized by the running of the glaze, forming dark color in all the lines and hollows of the modelling, is very charming, and makes a delightful contrast between the light stone below and the wood reading board above. The ball on which the eagle stands, and the plate by which it is secured to the book board, are a rich dark blue. I have sketched a bit of the only remaining carved work in the church, the southwest door, which shows the very early character of it. The door has three orders of shafts and roll mouldings. There is no old church in the country with more of simple impressive dignity about it, and the additions of the spire and of a rich and effective chancel end are much to be desired, and should be gladly subscribed for by those in the locality who are pleased to worship in so fine a church.

ROYAL ACADEMY GOLD MEDAL DESIGN: A CASINO. MR. J. HOWARD INCE, ARCHITECT.

[From the *Architect.*]

We publish this week the perspective view of the design to which the gold medal of the Royal Academy and a travelling studentship of £200 were awarded. The subject is a casino or club for an inland watering-place, the accommodation required being a large assembly or concert hall, with open arcades or balconies, a small theatre, café, dining, reading, smoking, billiard and card rooms, with the necessary offices; the building site being limited to 150′ x 200′, with a garden or entrance-court in front 100′ deep, showing a fountain. The conditions required all the work to be done in the Academy within six weeks, between the hours of 9 and 5.

Mr. Ince places his rooms as much as possible on the ground floor, prominence being given to the great hall, which opens onto a terrace, and from the galleries onto a wide balcony, whilst extra seats are afforded by a second end gallery over the card-rooms on the first floor, for which a special staircase is provided, besides the turret stair. But the most characteristic feature is the open-air café, round which the buildings are grouped. It should, however, be borne in mind, that this is not only a design for a casino, but also for an academic prize, demanding a certain severity and dignity of effect — two conditions not strictly compatible.

OLD CHIMNEY-PIECE.

[From the *Building World.*]

This fine old chimney-piece from Wraxhall, Wilts, is designed in the Elizabethan period, and is profusely ornamented by carving, which, although not so much appreciated now, from its apparent "clumsiness," for all that shows a large amount of good taste, ingenuity, and faithful workmanship. The female figures in the niches on the upper portion represent Arithmetic (with evidently an aching head), and Geometry, with a pair of compasses and a globe, a level and square being at her feet; Justice has the usual scales, but we observe no bandage to her eyes; and Prudence, a thrifty housewife with sleeves turned up, ready for her household duties. Wraxhall House, we learn, once was the property of a family of the name of Young. They were succeeded by the Long family, the first of that line being a man named "Long Thomas," who received the property from the Baron Lord Hungerford, and because he was called Long Thomas took the name for his own, changing it into Thomas Long, a descendant of whom was Sir Robert Long.

THE COMPTOIR D'ESCOMPTE, PARIS, FRANCE. M. COURROYER, ARCHITECT.

[From *La Semaine des Constructeurs.*]

The façade of this building lately finished in the Rue de Rougemont is of carefully selected white stone. The roof and bell-turret are covered with lead. The seated figure under the central arch, representing Prudence, and the two figures on either side of the pediment, representing respectively Industry and Commerce, are the work of M. Aimé Millet. The five medallions in the frieze represent in mosaic, on a gold background, Oceanica, America, Europe, Asia and Africa. The three doorways open on a vestibule which precedes an immense hall open to the public. The greatest care has been taken to perfect the systems of heating, ventilating, electric-lighting and pneumatic and acoustic communication that have been introduced into the building.

FACADE OF THE NEW LAW COURTS ON THE STRAND, LONDON. MR. G. E. STREET, ARCHITECT.

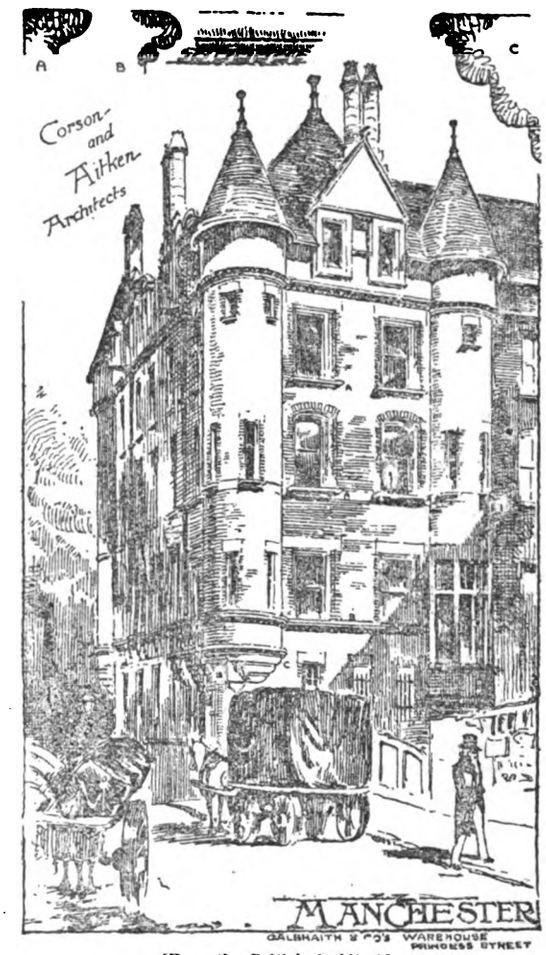
[From the *Building News.*]

DESIGN FOR A JACOBEAN SIDEBOARD BY MR. BRUCE J. TALBERT.

[From the *Cabinet Maker and Art Furnisher.*]

COMPETITIVE DESIGN FOR THE BOARD OF TRADE BUILDING, BUFFALO, N. Y. MR. E. P. TREADWELL, ARCHITECT, ALBANY, N. Y.

AN AMERICAN WRITER ON ENGLISH ARCHITECTURE.[1]



[From the *British Architect.*]

THE well-expressed opinions of the cultivated traveller on any country that he may visit invariably afford instruction; a special interest, however, is attached to the views of the American visitor to our shores. There is that sufficient community of language, literature, history, and traditions between us and our cousins, the absence of which leads on the part of all other "foreigners" to such amusing expressions of opinion regarding our country as, from time to time, are to be met with, even from highly-educated sources. It is additionally interesting when we have brought before us the views of a cultivated literary student, such as Mr. Richard Grant White, who, in his lately-published work, "England Without and Within," has given us the result of his experience during several months' residence among us. A glance suffices to show that his work is not the crude ill-digested expression of the hasty traveller or sight-seer, but of an observer who, long before reaching our shores, has prepared himself by a lengthy course of reading and thought.

To the cultivated American England is always "the old country;" what, we have Mr. Morley's recent assurance, Longfellow once said

[1] From the *Builder.*

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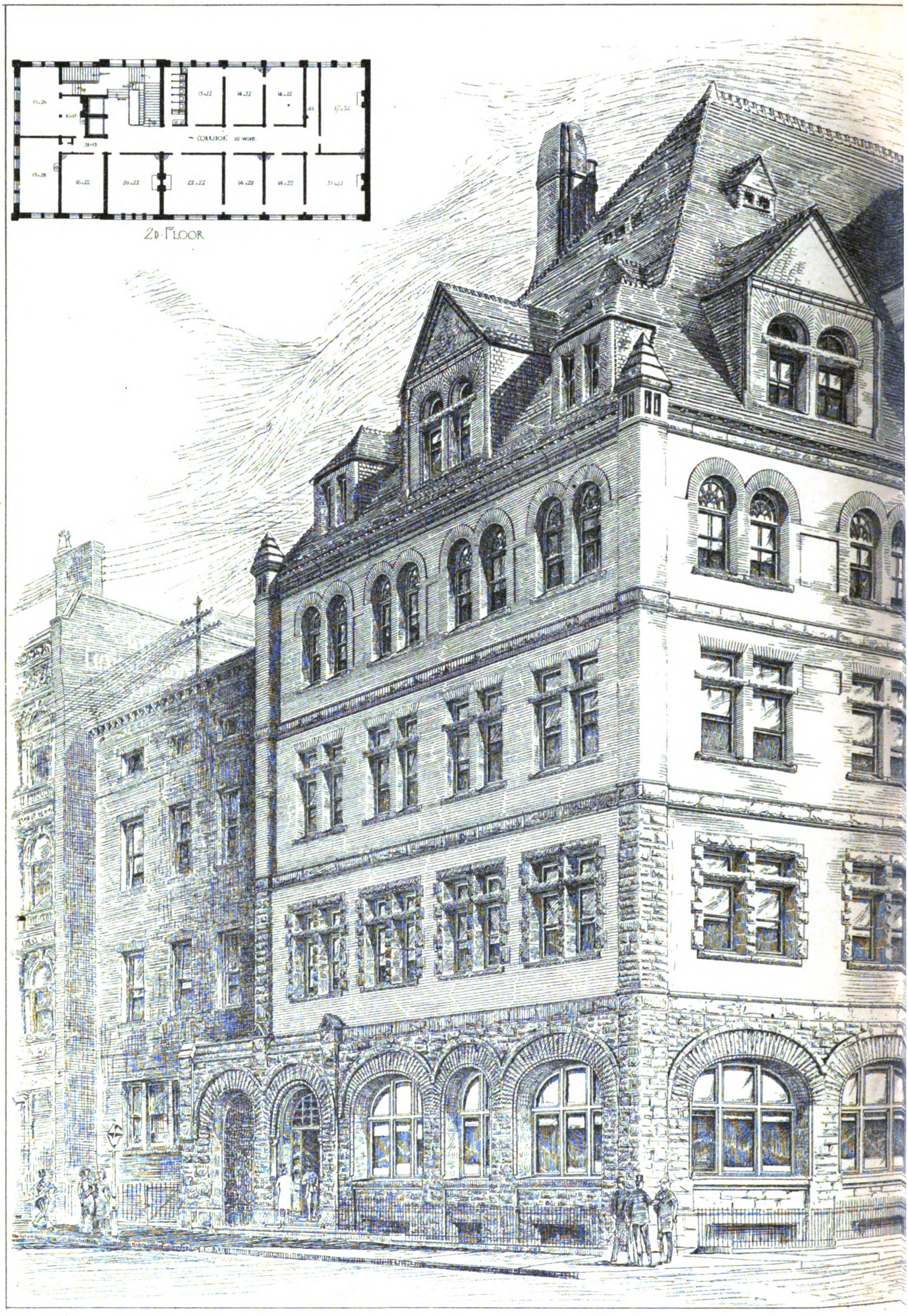

E.P. TREADWELL, Architect.
ALBANY & BOSTON

Competitive design for Bu

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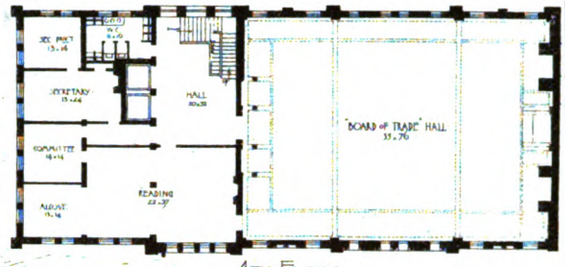

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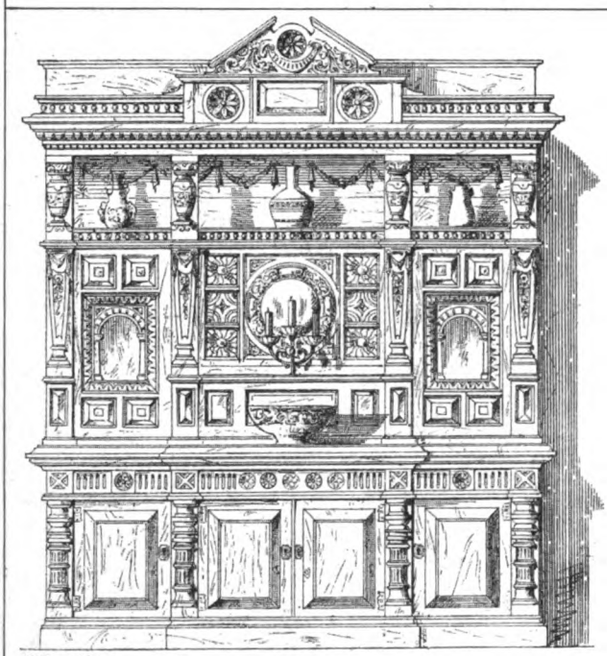
OUR FOREIGN EXCHANGES · VIII ·

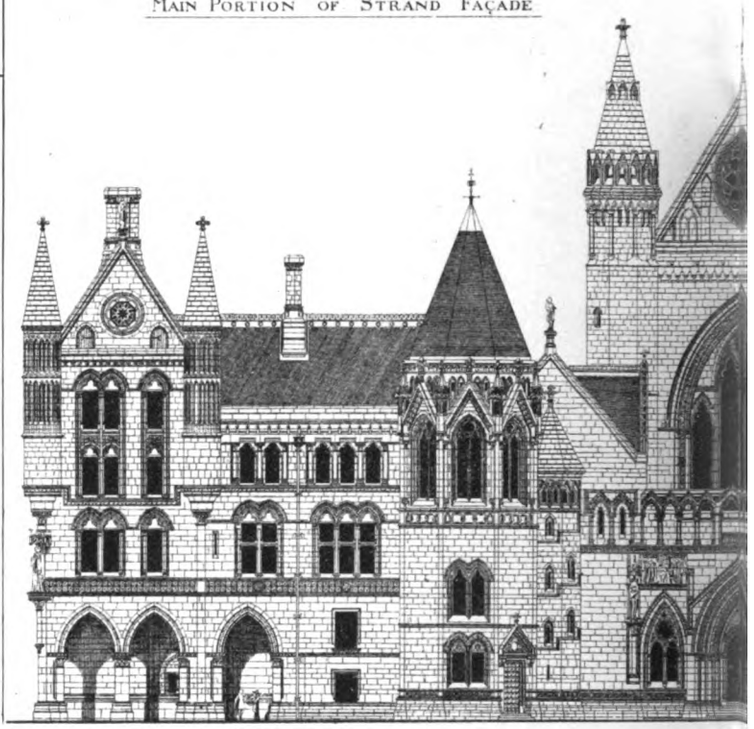


Gabinet Maker.

Design for Jacobean Sideboard. By B. J. Talbert.

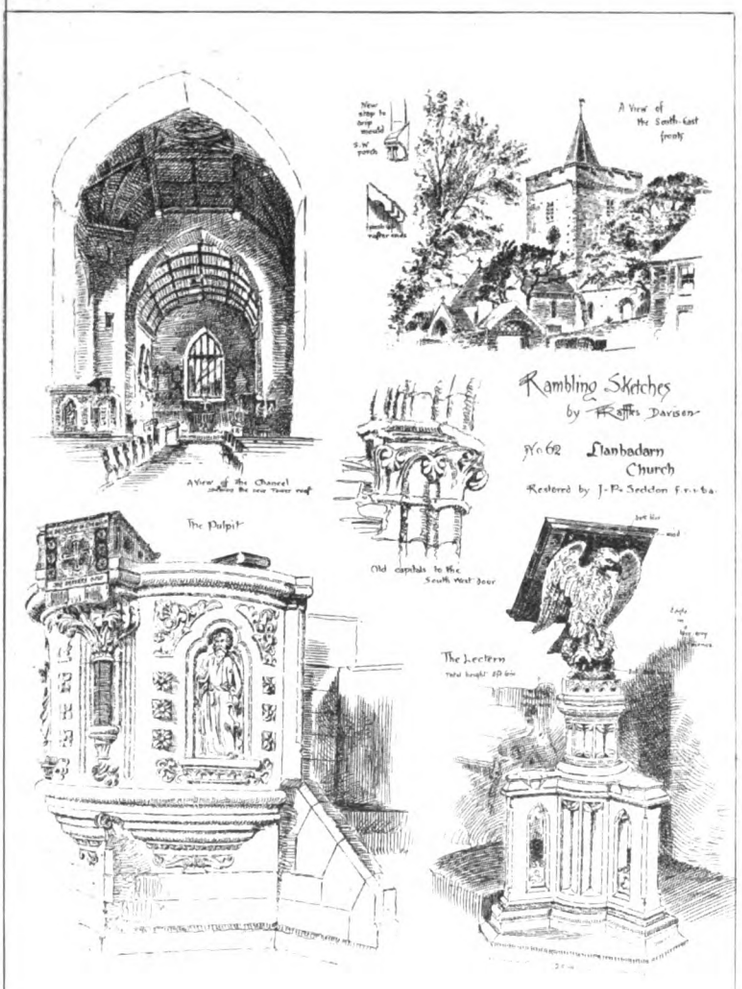
ROYAL COURTS OF JUSTICE

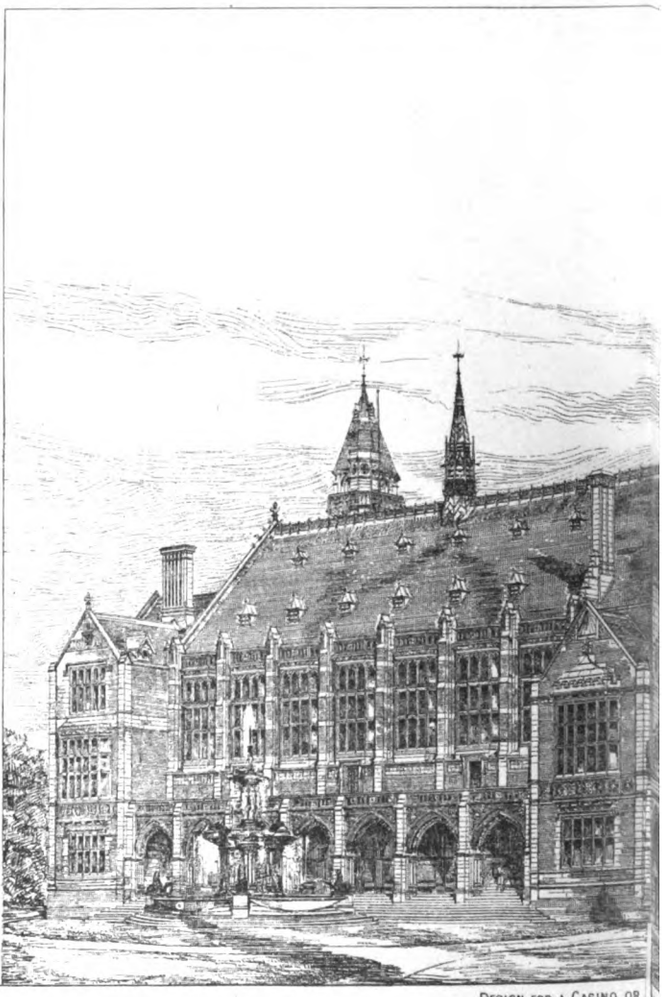
MAIN PORTION OF STRAND FAÇADE



WITNESS STAIRCASE

PRINCIPAL


A View of the Chancel
The Pulpit
Old capitals to the South West door
The Lectern
A View of the South-East front
Rambling Sketches
by Rafles Davies
No 62 Llanbadarn Church
Restored by J. P. Seddon F.R.I.B.A.



DESIGN FOR A CASINO OR

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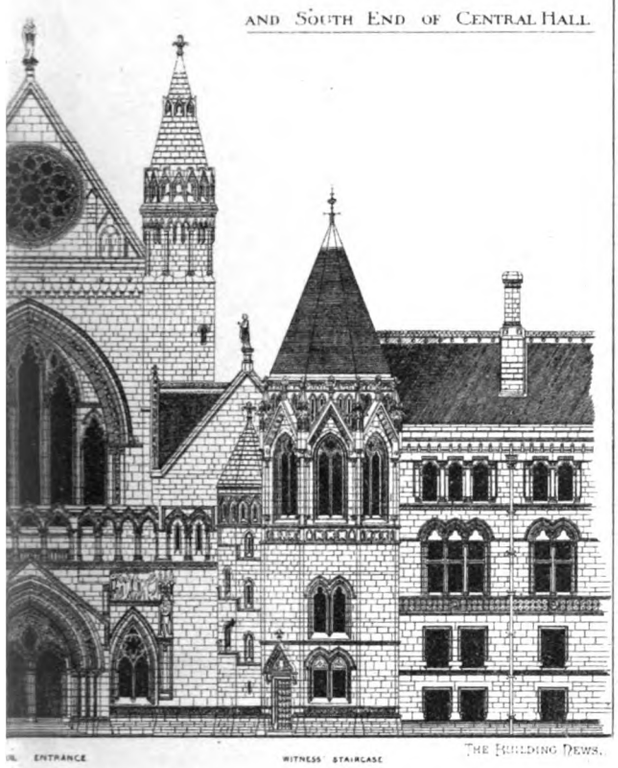
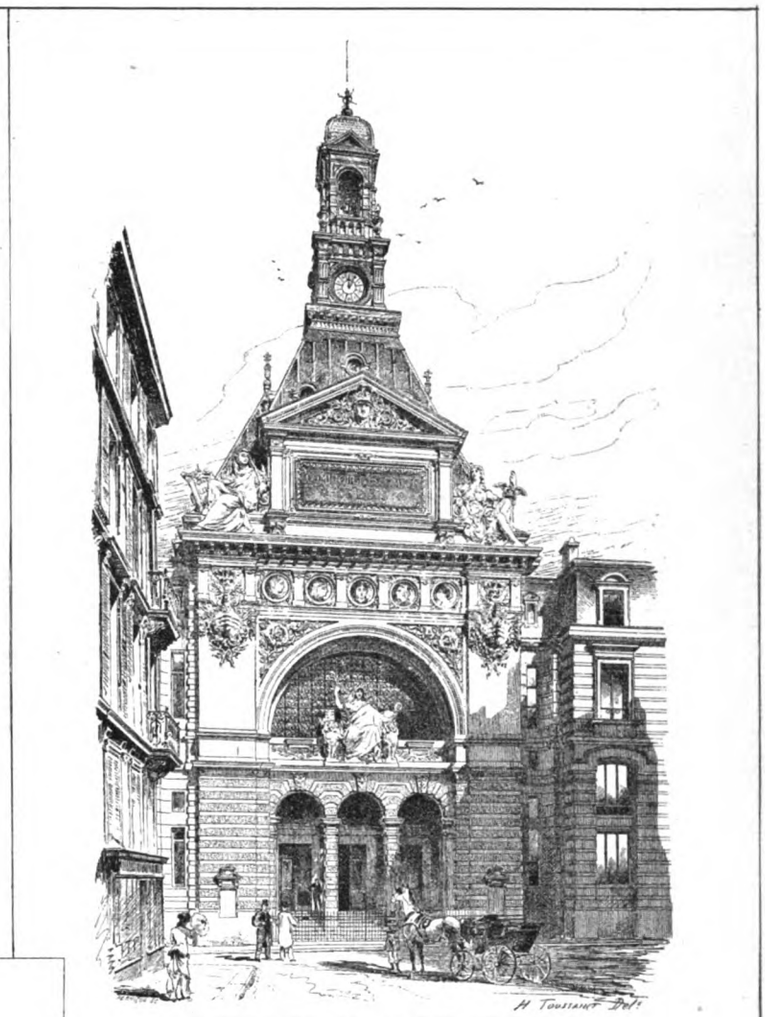
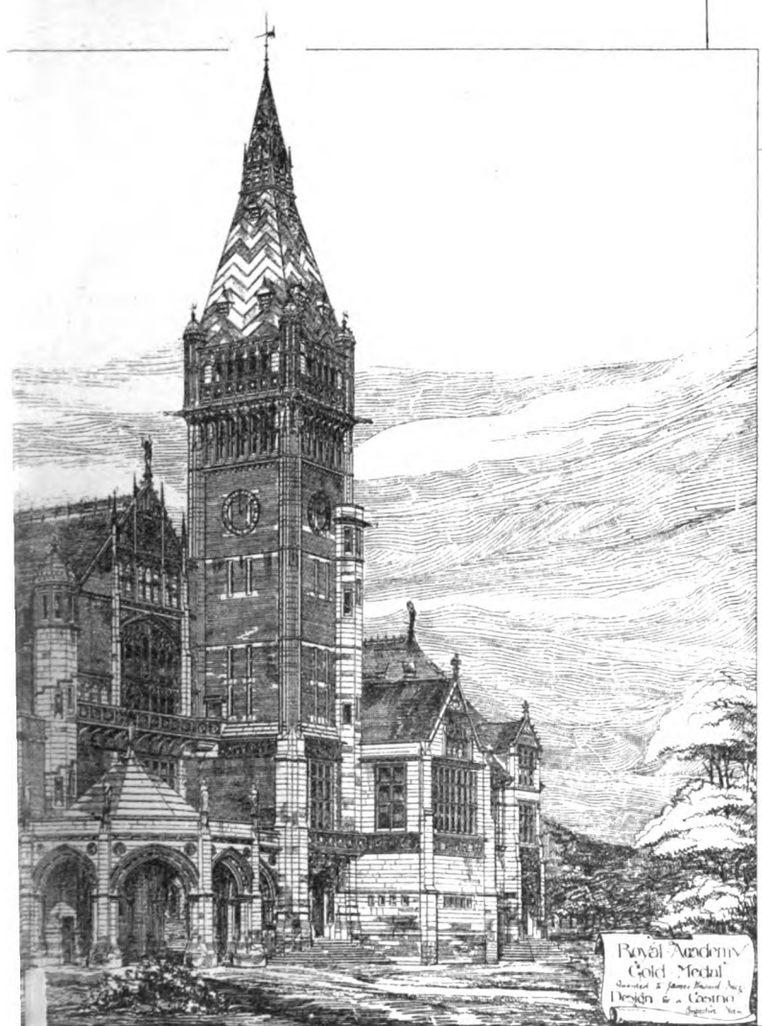
AND SOUTH END OF CENTRAL HALL.



ENTRANCE WITNESS STAIRCASE THE BUILDING NEWS.

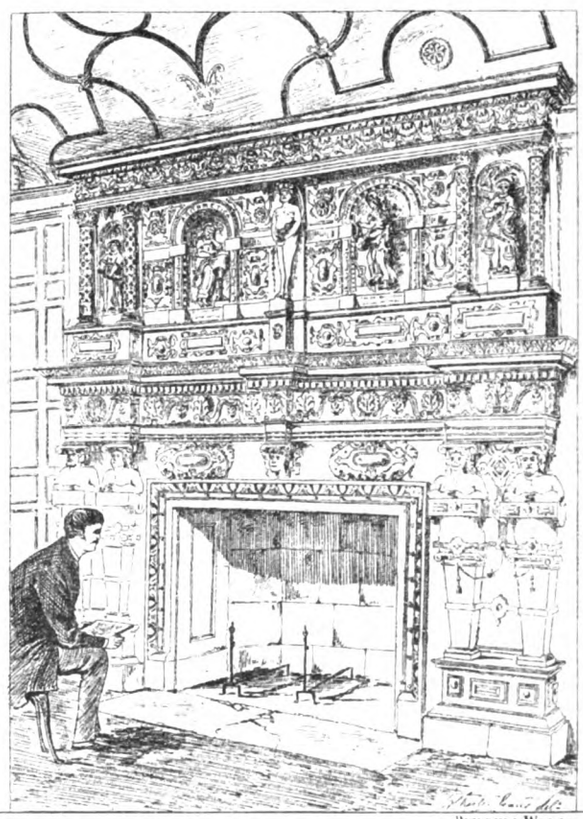


COMPTOIR D'ESCOMPTE. — Architecte : M. CORROYER. — Dessin de M. TOUSSAINT.
LA SEMAINE DES CONSTRUCTEURS.



FOR AN INLAND WATERING PLACE.
INCE, ARCHT

The Architect



Old Chimney Piece. Wrashall. Wilts. BUILDING WORLD.

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of his countrymen, that they were only Englishmen under a different sky, is largely felt to be true throughout all the eastern portion of the States, by all true Americans, of whom Mr. White is so characteristic a specimen. As a self-styled "unmitigated Yankee, not one of whose forefathers had been in England for 240 and odd years," Mr. White, like his countryman, Hawthorne, shows more than once his contempt of the far too lightly styled "Americans," who may, it is true, hail from the States.

Mr. R. G. White's work has so far received from the reading public in this country a most flattering reception, and very interesting, not only to its American but to its English readers will much of the work be found. In most cases the views of the author are clearly the result of well-weighed consideration; but there are points over which our critic might have passed with less confidence of tone. It is not our intention, nor indeed would it enter within our province, to speak generally of Mr. White's work. It is to the casual reference made by the author to the artistic beauties he had the opportunity of seeing during his visit that we wish to draw attention.

Mr. White seems to us to show want of the critical faculty, to say nothing of historical reverence, when he speaks as he does of St. Paul's as "outside and inside the ugliest building he ever saw." "Its forms are without beauty, its lines without meaning, its round windows are ridiculous. Its outside is not only ugly in form, a huge piece of frivolity, but its discoloration gives it a most unpleasant look." The reverence which the author so constantly expresses failed him singularly here at a point where it was most wanted. Our author's criticisms are scarcely less severe when he declares the City public buildings to possess the beauty of fitness, "for they look just what they are, — the creations, the abode, and the stronghold of British Philistinism, — rich, substantial, tasteless, and oppressively respectable;" again, he will find few to agree with him when he complains that even distance cannot render the Houses of Parliament "imposing," a fault which, whatever may be the faults of Barry's grandiose design, could not possibly be found by any one who has ever enjoyed the privilege of observing constantly from Westminster Bridge the long pile under the varying aspects of sunrise and sunset; while we can imagine Sir Edmund Beckett's feelings when Mr. White expresses his delight at "the grand, sweet voice" of Big Ben. But the *finale* of this paragraph is perhaps the most curious. "The parish churches are mostly by Wren or in his style, and are ugly with all the ugliness possible to a perversion of the forms of Classic architecture."

Though such opinions are somewhat calculated to weaken one's confidence in our author's judgment, yet it must be agreed that he is right in not finding that the newer parts of London near South Kensington are externally very interesting: he finds, however, that the houses are very handsome. "The pretentious talk I have heard about Fifth Avenue houses leads me to say that there are hundreds of houses in the best parts of London, around Hyde Park, on Carlton Terrace, and in other like places, which are far finer, much more noble, as Pepys would have said, than any that are to be found in New York, in Boston, or in Philadelphia." And our author here compares the modern houses of London and New York, the difference, he asserts, being "that the former, while less showy than the latter, are more spacious, and have more of the dignity which accompanies large and well-proportioned size. . . . The notion that rows of houses all alike are not found in England is altogether wrong: in the new parts of London such rows, and of very handsome houses, are common, while in the new parts of smaller towns the houses built for people of moderate means stand in rows of from a dozen to two dozen, as like each other as one brick is like another." In our shops Mr. White complains of a remarkable "absence of show and pretension," and he utters a very justified complaint respecting the irregular manner in which the streets are named and numbered. Of Fleet Street our author has naturally much to say, of the Old Cock hostelry and the quiet Temple Gardens; he expresses his surprise at the ruthless way in which we demolished Temple Bar, though the surprise is qualified by the remark that "the removal of the obstruction, architecturally not very admirable, shows how, at the last moment, the English mind can rise to the emergency of a great reform."

We can thoroughly understand Mr. White's "new and delightful sensation" of surprise at finding a town like Windsor so little increased in size after its centuries of existence, a town "neither great nor growing," and plainly without enterprise. "It gave rest to a certain stunned and weary feeling which comes upon one in the streets of New York, and in the streets of other places which are daily, with more or less success, doing all they can to be like New York, that dashing, dirty demirep of cities." Old and enthusiastic student of Shakespeare as Mr. White was, he was wise enough not to allow himself to be carried away at Windsor, where so few traces of the haunts spoken of by the poet now remain; indeed, as our author admits, he "found little of interest; the town is not new, but it is modern, and its Elizabethan features have all been improved away." The incident of the ruins of a burnt house meeting our critic's eye affords him the occasion to give us his opinion of the mode in which many of our English houses are built. "The house had not been wholly destroyed, and the skeleton still held together. It seemed to have been built some forty or fifty years ago. I was surprised at the flimsiness of the construction. The bricks were poor, and the mortar was bad. A house so built may be found anywhere, and I should not mention this, but as the occasion of remarking that I found the same inferior builder's work wherever I went in England. According to my observation, modern English houses, unless they are built with special care and unusual expense, are very slightly put together with bad materials and poor workmanship. It is the custom to put up the shells of houses, usually three or four together, and to leave them to be finished according to the wishes of an intending tenant or purchaser. I examined many of these without finding one even tolerably well built. . . . The mortar, although it had been set for years, would crumble under the touch of my stick, or even my thumb-nail. And walls of the modern-built villa houses that I visited were rarely more substantial, while the joiners' work was both slight and coarse. I also remarked that where recent additions had been made to the height of garden walls, the mortar in the new parts, although in general it was plainly ten or twenty, or even thirty years old, was more like mud than mortar. Indeed, I did not see in England in a new private building of moderate pretensions, any mortar worthy of the name. This attracted my attention, I need hardly say, because of the notion generally prevailing and sedulously encouraged by British writers, that all English work is distinguished from other work of its kind by excellence of material and thoroughness of workmanship; that although it might not have elegance, it was sure to be substantial. I did not find it so. In this respect in many ways I was disappointed. That such was once the character of the work of English artisans and manufacturers is not to be disputed, but during the last fifty years this glory of England seems to have departed." Severe as is this view, must it not be admitted that in too many cases it is only too true?

Windsor Castle, Mr. White, of course, saw pretty thoroughly, but probably the most interesting portion of the chapter, "A Day at Windsor," is devoted to the description of the antique and far too-little known Church of St. Andrew at Clewer, one of the oldest in the kingdom, and concerning which we can thoroughly believe our author finding many grown-up Eton boys had never seen.

In his chapter on "Rural England," in comparing our cottages, picturesque though the writer admits them to be, he is of opinion that the corresponding unsightly wooden houses of the United States, "in real comfort and in healthiness, are superior; for they are dry and warm. Their shingle roofs keep out the rain which comes through thatch, or soaks and rots it, and their clap-board sides do not become reservoirs of cold dampness. Rheumatism is not so common among those who live in them as it is among the English rustic folk," while a very proper mention is made of the carelessness in our villages respecting the objects that are "in unnecessary nearness to the house." "There are no indications that the inhabitants are anything more than tillers of the ground, and that when work is done they put it and its belongings out of sight and out of mind, and change their occupation with their clothes." Indeed, we can understand any one accustomed to the comfort and independence to be met with among the farmers of New England and the Middle States being somewhat surprised at the condition of the corresponding class in the old country; but, as our friend admits, whether they would be such good farmers "I very much doubt; whether they would have been more respectable men, or even happier, I shall not pretend to decide." The chapter on "Rural England" is of great interest, and the result of much observation. To many an English reader it will afford valuable matter for reflection. The same may undoubtedly be said of the succeeding chapters on "English Men and English Women," on "English Manners and Habits," on "Nobility and Gentry," and several others.

Hampton Court gives Mr. White another opportunity for an attack on poor Wren. "The first sight of the palace itself," the writer remarks, "is very disappointing, for the principal front which it presents shows, at a glance, the hand of the architect of St. Pauls." The seventeenth century, in spite of its peculiar interest, literary and historic, and its essential connection with the New England of which Mr. White is so characteristic a citizen, comes off hardly at his hands. Speaking of the famous Lely beauties, our friend remarks that they are "poor, flimsy, meretricious things." Had his remark been applied to the originals we could understand it from so stanch a descendant of the Puritans of the *Mayflower* days, but he goes farther when of these portraits he says that, "Even the flesh tints, which are the best part of them, are weak and washy, and the drawing is very bad. The eyes are, I think, the worst that I ever saw in paintings of any pretension." We are sorry to see our critic going beyond his province: his views, social, political, and historical, it is instructive to hear, but his artistic criticism not possessing the same solid foundation of experience we must object to. The remark made during a walk from Twickenham to Hampton Court, on the high-sounding names given to some of the "scrubby little roadside cottages with a neglected patch of earth or grass before them," which the writer met on the way, is more to the point.

The chapter entitled "A Canterbury Pilgrimage" contains some interesting and carefully gathered information. "There is no place in England," truly remarks Mr. White, "excepting London and Westminster, which is so enriched by memories and by memorials of the past; and yet I found intelligent, well-educated men in London and elsewhere, not three hours away, who had never seen Canterbury and its great cathedral." Mr. White of course put up at the "Rose" inn, on the difference of which from the hotels of his own country he has much to say. Our author is charmed with our inns, where "you do not feel as if the house were a mere continuation of

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the street, except the paving-stones and the carts and horses." With Canterbury our author is enchanted, as a town which like so many others in England has "manifestly grown and not been made to order, not put in sections by contract . . . . one house built in a certain place, and in a certain way, because its builder chose to build it there and in that way"; and this charm of our old towns which appeals to the American visitor, let our builders see that they respect and endeavor to continue. Mr. White, though he admits he did not go to Canterbury to "mouse among antiquities nor to study architecture," after seeing the cathedral, with which, of course, he was much impressed, did not neglect to visit St. Martin's Church, with its thirteen centuries of hoary antiquity, that lie buried beneath the ivy that clambers round the old tower and over the Roman bricks of the walls.

Speaking of Cambridge, our author remarks that the architectural interest of Oxford "is so great that Cambridge is too much neglected in this respect. Its college buildings are so beautiful that only to see them would be worth a journey from any part of England" — a statement that all who know the old town would fully bear out. Oxford and Cambridge, with many of their interesting traditional customs, are well described by Mr. White, who had the advantage of excellent introductions to the authorities. Of Oxford he does not hesitate to say that "it is the most beautiful place" he saw in England; indeed, he is inclined to think "the most beautiful town in the world," and Mr. White warmly urges on his countrymen who may visit England "with a desire to see its characteristic beauties to give at least two or three days to Oxford."

It is a serious and lengthy chapter, one dealing with a subject which, as Mr. White himself says, is of equal importance to his countrymen as to us, — the chapter on the "National Vice" of drunkenness, — a vice of which, however, "it is to be said," he remarks, "that there are reasons for it, which do not exist in other countries. England lacks good" [this he explains afterwards as meaning "soft"] "water, and produces no wine." The statement that "many people cannot drink the water of England unqualified, without being made ill," can be thoroughly borne out by fact. Mr. White is not severe on the national vice: he only bewails its prevalence, and particularly its saddest form, among the women; he is only one more of those who openly aver that "such steady besotted drunkenness seems to be at the bottom of much of the distress and most of the crime in England." It would seem, however, our author concludes, that we are gradually freeing ourselves of the vice. Abstemiousness in England is not so easy or desirable as it is in America, "and hardest, although most desirable of all things everywhere, is not abstemiousness, but temperance."

Mr. White, of course, does not neglect a description of the obligatory pilgrimage of every good American to Warwick and Stratford-on-Avon; for even those Americans who are only hurrying through our country to Paris never fail to visit Shakespeare's birthplace, "the proportion of these being very much larger," remarks Mr. White, "than that of the cultivated Britons who render their personal homage to him whose works are our richest common inheritance." But with Stratford Mr. White is sadly disappointed. "The truth is," he admits, "the Stratford that I knew (and about which I had read so much, and the topography of which I had studied until I could have gone straight to every place I wished to see without a guide) was Shakespeare's Stratford, and that has passed away. The truth is, that in the stead of old Stratford, there is now a successful place of business," and, he concludes, after describing his other disappointments, by advising no one to go to Stratford "who would preserve any elevated idea connected with Shakespeare's personality"; but we consider Mr. White is going too far when he roundly declares of the poet's monument in the church that "it is ugly; the staring painted figure-head-like bust hideous."

On his return to London our author admits to a positive feeling of "getting home again," as, in spite of the little beauty of our metropolis, its dulness and dinginess and commonplace character, yet the whole of it outside of the city proper has a home-like look." Some of our streets remind Mr. White of the thoroughfares in his own country, a fact which any one who knows America can fully bear out. "There is," in fact, as he very sensibly points out, "no indication of a difference of character between the people who built London and those who built New York and Philadelphia. The unlikeness is produced simply by the fact that the newer and larger parts of the latter places were laid out, projected, and that the whole of the former slowly grew;" however, as an impression, Mr. White admits to finding "striking" the general unlikeness of London to towns in the United States, an unlikeness "very much greater at the present day than it reasonably should be." Certainly, the older parts of New York singularly resemble the older parts of London. On our London statues Mr. White does not exercise his usual artistic severity of criticism: he even finds their number "great." "It could hardly be otherwise in the capital of a country with such a history as England's." Compared with New York and the cities in "the States," this is, of course, true; but it hardly suffices when we think of the Continent.

Without any affectation of thoroughness Mr. White has placed before his countrymen, and, indeed, before English readers, who, perhaps, will most profit by a perusal of his book, a curious and instructive picture, which fully answers to its title, of "England Without and Within." — *The Builder.*

TILES.

Plain tiles are usually made ⅝″ in thickness, 10½″ long, and 6¼″ wide. They weigh from 2 to 2½ pounds each, and expose about one-half to the weather. 740 tiles cover 100 superficial feet. They are hung upon the lath by two oak pins inserted into holes made by the moulder. Plain tiles are now made with grooves and fillets on the edges, so that they are laid without overlapping very far, the grooves leading the water. This is economical of tiles, and saves half of the weight, but is subject to leak in drifting rains, and to injury by hard frosts.

Pan tiles, first used in Flanders, have a wavy surface, lapping under and being overlapped by the adjacent tiles of the same rank. They are made 10½ × 14½″; expose 10″ to the weather; weigh from 5 to 5¼ pounds each; 170 cover 100 square feet of surface. Crown, ridge, hip, and valley tiles are semi-cylindrical, or segments of cylinders, used for the purposes indicated. A gutter tile has been introduced in England, forming the lower course, being nailed to the lower sheathing board or lath.

Siding tiles are used as a substitute for weather-boarding. Holes are made in them when moulding, and they are secured to the lath by flat-headed nails. The gauge, or exposed face, is sometimes indented to represent courses of brick. Fine mortar is introduced between them when they rest upon each other. Siding tiles are sometimes called weather tiles and mathematical tiles: these names are derived from their exposure or markings. They are variously formed, having curved or crenated edges, and various ornaments, either raised or encaustic.

The glazed tiles are inferior to slate, as they imbibe about one-seventh of their weight of water, and tend to rot the lath on which they are laid. Good roofing slate only imbibes one two-hundredth part of its weight, and is nearly water-proof.

Encaustic tiles are ornamental tiles, having several colors. A mould is prepared which has a raised device on its face, so as to leave an impression on the face of the tile cast therein. This intaglio recess is then filled by a trowel with clay compounds, in the liquid or slip stage, and which retain or acquire the required colors in baking. The tile is then scraped, smoothed, baked, and glazed. This tile is common in ancient and modern structures. The glazing came from the Arabs, who derived it from India, and primarily from China.

Drain tiles are either moulded flat and bent around a former to the proper shape, or are made at once of a curved form by pressing the clay through a dod or mould of the required form. The latter plan is now generally used.

Various machines are used in the manufacture of tiles. One of these has two iron cylinders, around which webs of cloth revolve, whereby the clay is pressed into a slab of proper thickness without adhering to the cylinders. It is then carried between two vertical rollers, which impart a semi-cylindrical or other required shape, after which the tiles are polished and finished by passing through three iron moulds of horse-shoe form, being at the same time moistened by the dripping of water from a tank above, and finally conducted off upon an endless web.

In more recent machines the tiles are generally formed at one operation, by pressing. A charge of clay sufficient to form a number of tiles is placed in a cylinder and subjected to the action of a piston, which forces it out as a continuous tube, after which it is cut in lengths by a wire. The most modern machines generally employ a screw, which serves at the same time to mix the clay and force it through the mould; the process of feeding and moulding is thus rendered continuous, no time being lost in charging the cylinder.

One of the most improved of modern machines consists of a vertical pug-mill, containing rotary curved knives and a screw follower for forcing the clay through the dies. The pipe, on issuing from the dies, is carried forward by a series of rollers having hollowed surfaces, and is cut into lengths by a rocking frame provided with cross wires. In another machine the clay is forced through the ties by two plungers working in boxes at the base of the pug-mill, and reciprocated by cranks set at right angles to each other on the same shaft. Two sets of dies are employed, one plunger being retracted to allow its box to receive a supply of clay, while the other is engaged in forcing the clay through its die.

Tiles are usually placed in the kilns in bunches of twelve, and laid alternately cross and length wise. The spacing of the tiles allows the circulation of the heat between them, and the circular form of oven is found well adapted to secure uniformity of heat.

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The kiln is protected on the windward side to prevent uneven urging of the fires. The oven being set the doorway is bricked up and daubed, the fires kindled and kept burning, moderately at first, and then more freely. The usual time for firing is thirty-eight hours. Three days are then allowed for cooling, and they are afterward taken out of the kiln. Those tiles that are to be made of a grayish color are thus treated: it having been ascertained that the tiles are burnt enough, and while still red-hot, a quantity of small fagots of green alder with the leaves on is introduced into each flue. The flue-holes are then well secured and the holes in the roof each stopped with a paving tile, and the whole surface is covered with four or five inches of sand, on which a quantity of water is thrown to prevent the smoke from escaping anywhere. It is this smoke which gives the gray color to the tiles, both internally and externally. The kiln is then left closed for a week, when the sand is taken off the top, the door and roof holes are opened, as also the flue holes, and the charcoal produced by the fagots taken out. Forty-eight hours after the kiln is cool enough to allow the tiles being taken out and the kiln charged again. Whenever any of the tiles are to be glazed they are varnished after they are baked; the glaze being put on, the tiles are put in a potter's oven till the composition begins to run. The glaze is generally made from what are called lead ashes, being melted and stirred with a ladle till it is reduced to ashes or dross, which is then sifted and the refuse ground on a stone and resifted. This is mixed with pounded calcined flints. A glaze of manganese is also sometimes employed, which gives a smoke-brown color. Iron filings produce black; copper slag, green, smalt blue. The tile being wetted, the composition is laid on with a sieve and the tile subjected to the heat necessary to vitrify the application. — *Pottery and Glassware Reporter.*

FIRE-PROOF PAINTS.

THE catastrophe at Vienna gave a great impetus to the inquiry for fire-proof paints. It contributed somewhat to our knowledge of the materials that may be used for coating objects so as to render them almost incombustible. To make that acquaintance more general, it will not be out of place to enumerate the various means that have from time to time been recommended for rendering objects fire-proof. Such means have been known for a long time: unfortunately their use has hitherto been more or less neglected, and it is only now that their usefulness is receiving due recognition. Thus, soluble glass has been known for a long time as a safe covering, but the instances in which it has been applied are very rare indeed, although its action is remarkable. In one case an experimentor demonstrated the protective qualities of soluble glass by leaving a wooden stirrer saturated with it in the intense heat of a coke-oven without its taking fire. It was charred only after it had remained there for some time. Of course wood covered with such paint and its pores well penetrated by it will ultimately burn; but it is ignited only with the greatest difficulty and the fire spreads so slowly as to render a large conflagration impossible. It is very advisable to mix soluble glass with whitening, which mixture turns after a time into an insoluble combination. In order to cause the paint to penetrate the wood, it is best to warm it well before application. Soluble glass is not to be recommended for dress materials or woven stuffs generally: it makes them too stiff and also spoils the color. Its use would be best limited to wood, stiff linen, scenery in theatres, etc.

The following application is also recommended for wood: One part of perfectly sound English Roman cement, two parts of washed scouring sand, one part of fresh cheese (curds), and three-quarter part of buttermilk are well mixed and the wood coated twice with the mixture. While applying it the mixture must be well stirred to prevent the sand settling at the bottom of the vessel. The first coat must be allowed to dry—which would not take long in summer — before the second is put on. Surfaces to be thus coated had better be left rough and unplaned, which gives them the appearance of stone. In order to insure durability wood-work in a horizonal position receives three coatings of varnish mixed with green earth; for slanting surfaces two coats are sufficient; for vertical surfaces one coat suffices. For smooth surfaces two parts of the above cement, one part of fresh cheese, and a quarter-part of buttermilk are taken; but only so much must be prepared of these mixtures as is used up at once.

If 100 parts by weight of alum are dissolved in 800 parts of boiling water, and 25 parts of English sulphuric acid are added to the solution when cold, an excellent fire-proof grounding is obtained, which, if the respective parts are so many kilogrammes, costs about 24 *s*, and must be applied to the wood twice. To prevent the alum being destroyed by the moisture of the atmosphere the following coating is recommended: ten litres of lime-powder and ten litres of fresh but poor cheese are worked well with about three litres of water with a wooden shovel, ten litres of sand and as much water being added during mixing as is required to convert the whole into a stiffish mass. It is advisable to strain this mass through a medium sieve before use. Mineral or metallic color may be added.

Potash solved to saturation in water is also a protective covering for wood. After this coating has been applied the wood receives three or four applications of a mass prepared of one part by weight of potash, twenty parts of yellow clay, and one and a half parts of flour, and mixed with water to the consistency of ordinary size-color. A fire-proof coating may also be obtained by mixing twenty-four parts of slaked lime, one part of fat blubber, one part of powdered gypsum, two parts of fine sand, four parts of brick-dust, three parts of hammer-slag, and four parts of chopped calf's hair, with enough bullock's blood to produce a good combination of the several materials. A mixture of lime and alum is likewise said to give a good fire-proof covering to wood, which must be well saturated with it; also a mass consisting of twenty-five parts of borax, twenty-five parts of Epsom salts, and one hundred parts of water; further, a mixture of three parts of slaked lime, two parts of screened wood-ashes, and one part of fine sand, rubbed with linseed oil to a paint readily applied. Another fire-proof covering consists of 66.6 parts of gypsum, 33.3 parts of sulphate of ammonia, and 100 parts of water.

For effectually rendering woven fabrics fire-proof, tungstate of soda, which comes into the market in the form of white needles, takes the first place. When it is desired to use it for impregnating dresses, covers, curtains, etc., it is dissolved in five times its quantity of water and a small quantity of phosphate of soda is added. The material, after being completely saturated with it, is wrung out and dried in a moderately warmed room. If this substance is used the materials impregnated with it are not only protected against fire, — they carbonize but slowly, — but they preserve their natural suppleness and elasticity. Unfortunately this substance is too dear to find general application. The mixture above-mentioned, of borax and Epsom salts might, however, take its place and is considerably cheaper. Both possess the valuable property that they do not destroy even the finest threads, but those colors which water damages are injured likewise by them. For tissues, in using the two last-mentioned substances, the following is a good proportion for mixing: Shortly before use two and a quarter parts by weight of Epsom salts and three parts of borax are dissolved in twenty parts of water. The latter must be warm and the whole is stirred with a wooden stick until the salts are completely dissolved. Impregnation is effected in the same way as in the case of tungstate of soda, only it is advisable, instead of wringing out the immersed materials, to mangle them between two cloths in an ordinary mangle. If the stuffs are to be ironed out at once and it is desired to give them the requisite stiffness, the necessary quantity of starch is at once added to the warm solution.

Paper and woven stuffs may also be treated with a solution of three parts of phosphate of ammonia, two parts of sal ammoniac, one part of sulphate of ammonia, and a little chloride of calcium in forty to fifty parts of water. If starch is mixed with it at the same time no more water is required, not even for damping down. The stuffs become somewhat harder, but the change is unimportant. A combination of gypsum and sulphate of ammonia, mixed in varying proportions of quantity according as the material to be impregnated is coarse or fine, is said to be also a capital protection against fire, which has, besides, the advantage of cheapness. Vanadiates, on the contrary, are dear, but they may be recommended because they do not injure either the colors of the tissues to which they are applied or deposit white crusts on the surface.

There is no need to further extend this list, which includes some very valuable means for arresting the spread of fire. They have all been tested more or less by experts and found efficient. In the immediate vicinity of a flame materials impregnated with them may take fire, but they merely get charred and burn but slowly. Some of the above means have been tried in this country, but not any of them have, to our knowledge, been extensively applied. It appears to us, therefore, desirable that the lessons conveyed by the recent trials with asbestos paint should be noted. The preparation of that paint has been described before, but it may be as well to state briefly once more that the substance known as Italian asbestos is mixed in a finely-divided state with the other ingredients which make up the paint to be used. It has been repeatedly stated and practically demonstrated that paint thus prepared renders the objects to which it is applied as a protective covering perfectly fire-proof. All who witnessed the latest experiment on the Thames embankment a few weeks ago must have come away with the impression that a substance has been found which will resist fire long enough for all necessary measures for the saving of human lives to be taken before the flames become uncontrollable. — *The Builder.*

STRAW LUMBER.

WINFIELD, KAN., September 15, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — If those parties inquiring for manufactures of straw lumber will write to the Lawrence Straw Lumber Manufacturing Company, Lawrence, Kan., I think that they can find out what they desire to know. Yours respectfully, S.

[As there is a possibility that there is another manufactory of straw lumber at Lawrence than that mentioned in our last issue, we publish this with our thanks to our correspondent. — EDS. AMERICAN ARCHITECT.]

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ROBERT BRIGGS, C. E.

Ragatz, Switzerland, August 18, 1882.

To the Editors of the American Architect: —

Dear Sir, — I have just received the sad intelligence of the death of Robert Briggs, the eminent civil and mechanical engineer, and, as an old and intimate friend, wish to add my share to the tribute of admiration and respect which his memory is sure to call forth from all members of the profession who had the pleasure and advantage of his acquaintance.

My own friendship with him covers a period of more than sixteen years. It commenced with a trip to Europe in his companionship, during which we visited together nearly all the most important engineering establishments in England, Belgium and a part of France, and met many of the most noted engineers and scientists in the places we visited. From the intimacy thus begun, and which has continued unbroken until now, I can testify to the many high qualities of mind and heart which he possessed, and to the high professional position accorded to him both at home and abroad by those conversant with his abilities and with the products of his mind and pen.

One of his most notable traits was the comprehensive scope of his knowledge, which covered almost the entire field of engineering, both civil and mechanical, and included much also of metallurgy, chemistry, architecture and applied sciences. On almost any topic under these many heads he could discourse as a master, with a minuteness and familiarity astonishing to any one but those who knew what an extraordinary range was covered by his own personal experiences in connection with mechanical and industrial operations, and who knew also how far these were supplemented by professional study and reading, continued uninterruptedly during the forty years of his business life. Added to these were the advantages of a good early education, an exceptional aptitude for mathematics (in which he excelled), and a very retentive memory. Apropos of the latter, I recall that during our English trip we made occasional digressions to visit noted historical places, and that at such times he was as full of facts and figures relating to the scenes we were visiting as a student of history, while his knowledge of architecture contributed further to the interest of his conversation. He was an omniverous reader, enjoying much even of the lighter literature, and a conversationalist of rare ability. His temperament was placid and equable, and his companionship a pleasure which his intimate friends at least can never forget. Among the latter are included many of our most prominent engineers and scientists and not a few of those of England.

During all his life Mr. Briggs was a constant writer on professional topics. Many valuable papers from his pen are scattered through the engineering literature of the past twenty-five years, which it is greatly to be hoped may yet be brought together in one volume. A still larger amount, doubtless of equal value, exists in the form of unpublished manuscripts, studies, notes and records of practice. It is most earnestly to be hoped that measures will be taken to preserve these fruits of many years, and to put them in form available to other members of the profession which Mr. Briggs did so much to promote and in the ranks of which he stood so high.

On the writer his loss falls keenly as that of a dear and valued friend. Respectfully, Henry R. Towne.

THE SIPHONAGE OF TRAPS.

To the Editors of the American Architect: —

Dear Sirs, — Mr. Philbrick is in one respect quite right. When I wrote my reference to his experiments his paper had not yet been published. My remarks related to what he himself told me of his results when I visited his apparatus, some months ago. When he takes it upon himself to "infer that the gentleman commented on the paper before he had read it," he probably forgets what he did tell me.

His reported results are much more decisive than were his earlier ones, but I think not yet fully conclusive.

Yours, etc., Geo. E. Waring, Jr.

NOTES AND CLIPPINGS.

Priming for Oil Paint. — O. Kall, of Heidelberg, prepares a substitute for boiled oil by mixing ten parts of whipped blood just as it is furnished from the slaughter-houses with one part of air-slaked lime sifted into it through a fine sieve. The two are well mixed and left standing for twenty-four hours. The dirty portion that collects on top is taken off, and the solid portion is broken loose from the lime at the bottom, the latter is stirred up with water, left to settle, and the water poured off after the lime has settled. The clear liquid is well mixed up with the solid substance before mentioned. This mass is left standing for ten or twelve days, after which a solution of permanganate of potash is added, which decolorizes it and prevents putrefaction. Finally the mixture is stirred up, diluted if necessary with more water to give it the consistence of very thin size, then filtered, a few drops of oil of lavender added, and the preparation preserved in closed vessels. It is said to keep a long time without change. A single coat of this liquid will suffice to prepare wood or paper, as well as lime or hard plaster walls, for painting with oil colors. This substance is cheaper than linseed oil and closes the pores of the surface so perfectly that it takes much less paint to cover it than when primed with oil. — *Deutsche Industrie Zeitung.*

Straightening the Spires of the St. Marienkirche at Lubeck. — The St. Marienkirche or Church of St. Mary is beyond question the finest of all the sacred edifices in the ancient Hanseatic port and free city of Lubeck. It was erected in 1304 and is built of brick, in that particular Gothic style which is frequently met with on the shores of the Baltic. The church has three naves, the central one being of the unusual height of 127′. The two towers, which form so conspicuous a feature of the city, are no less than 407′ high. For some time past these have required new roofing, but before the work was commenced it was determined, after much discussion, to perform on them a preliminary operation of a somewhat hazardous and uncommon description. Every visitor to Lubeck will have noticed that the two spires are tilted very considerably out of the perpendicular. The height of the tower from the ground to the commencement of the spires is 190′, while to the top of the spires the distance is 217′ further, making the total elevation as above stated, 407′. The top of the southern spire has for years inclined to the south and west. The deviation from the perpendicular was 12′ towards the south and 9′ to the west. The rafter work dates from the year 1350. The operation which it was decided to attempt was to bring this spire into its original vertical position. Not a few professional men predicted that the result would be a disaster. However, it was remembered that in the year 1860 a Lubeck builder, Herr Albrecht Grube, had actually performed a straightening operation upon the leaning southern tower of the Lubeck Cathedral with perfect success, and accordingly the authorities were not to be deterred from attempting the same thing with the spires of the Marienkirche. The operations on the southern spire were commenced some time ago, and last week were completed with perfect success. They were carried out by a Lubeck carpenter, Herr Krause, under the direction of a building inspector of the city, Herr Schwiening, who promises to publish a detailed description of the method he adopted in executing the work. All that is at present known on this point is that the straightening of the spire was effected by help of a number of small iron screws. In consequence of this success it has been determined to proceed in like manner with the similarly leaning northern spire of St. Mary's. — *Exchange.*

Relics found in a Roman Tower. — A Roman tower discovered in the Sablon quarries in Lorraine has been partly unburied and searched to the depth of about five metres. The walls are in a good state of preservation, being constructed of white stone and held together by a fine red cement harder than the stone itself. A number of interesting relics have been found among these ruins. Outside the tower is some fine sand, to a depth of 1 metre 50 centimetres, while inside a layer of dark earth contained some large pieces of tile and bricks of rather extraordinary dimensions. As the Romans paid taxes according to the number of their tiles, they deemed it wise to have them made as large as possible, and these specimens measure from 0m. 15 to 0m. 40 in length, and 0m. 3 to 0m. 10 in thickness. They are in splendid condition, being of a bright red color and having a metallic sound which indicates the excellence of their manufacture. The Romans exposed their tiles to the air, allowing them to dry before placing them in the ovens, where they were subjected to the highest heat, which, however, was only reached in slow and regularly progressive stages. France was well wooded during the Roman epoch, and for that reason the manufacture of tiles and bricks presented no difficulties. A number of statuettes and coins and inscriptions to pagan deities have been brought to light, and they tend to show that some of these relics belonged to the legions stationed in Lorraine from the year 50 to 300 of the Christian era. The tower is vaulted and is supported on masonry in the form of four arches. — *American Register.*

Electricity accidentally developed by Friction. — A curious instance of electrical development by friction has been observed in a Berlin brewery, though not without causing a good deal of alarm among the workmen. The building is constructed of stone and iron, the floor being laid in asphalt. In the upper story of the malt house was a malt-cleaning machine, from which the malt was taken through an iron shoot to wagons below for distribution through the works. It was found that if this machine remained in operation for a length of time electricity was developed by the friction of the malt with the shoot, and in the most isolated portions of it the tension of the electricity was such as to cause a continuous stream of sparks. The malt itself crackled, while the sparks flew from it to the hands of those standing by, who looked upon the manifestation as one of demoniacal origin. An expert was called in to examine the phenomenon, and the subject was brought before the Electrical Technical Union. Dr. Werner Siemens showed how, through the influence of the asphalt floor, the malt-room was so insulated from the other portions of the building as to become a large Leyden jar. — *London Globe.*

M. Charnay in Mexico. — M. Désiré Charnay, in reporting to the French Geographical Society the results of his three years' explorations of Central American ruins, mentioned that during his latest journey in Yucatan he entered the remains of a palace, at the town of Kabah, and found on the walls thereof an Indian painting of an armed Spaniard on horseback. This, he maintained, is indisputable proof that the palace was inhabited at the time of the Spanish conquest. Some authorities hold that these ruins belonged to a people long ago extinct, and that they are not less than 3,000, perhaps 10,000, and; according to one traveller, 40,000 years old. M. Charnay will not admit that they are more than 750 years old, and holds that they all belonged to the race which the Spanish invaders found in possession of the country. — *New York Tribune.*

A New Process of distilling Turpentine —Spirits of turpentine, says the *Wood-Worker*, is now made from saw-dust and refuse of the saw-mill. It is extracted by a sweating process, and yields fourteen gallons of spirits, three to four gallons of resin, and a quantity of tar per cord. The spirits has a different odor from that produced by distillation.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

264,081. LOCKING-LATCH. — Freidrich Hasdenteufel, Iserlohn, Prussia, Germany.

264,116. HOT-WATER HEATING APPARATUS. — Henry Swindell, Allegheny, Pa.

264,117. METHOD OF BURNING BRICK. — Alfred Yates, Cambridge, Mass.

264,118. BRICK-KILN. — Alfred Yates, Cambridge, Mass.

264,206. CURTAIN-FIXTURE. — Charles J. Truemper, Indianapolis, Ind.

264,214. PIGMENT FOR DISTEMPER-PAINTING. — John R. Alsing, Hoboken, N. J.

264,241. LOCK-FAUCET. — William S. Campbell, New Orleans, La.

264,242. FIRE-EXTINGUISHER. — Chas. B. Chace, Cincinnati, O.

264,245. LADDER. — Andrew S. Coles, Mamaroneck, N. Y.

264,250. AUTOMATIC VALVE FOR WASTE-PIPES. — Francis A. Davis, New York, N. Y.

264,254. FIRE-ESCAPE. — William T. Davis, Philadelphia, Pa.

264,262. EAVES-TROUGH HANGER. — Joshua Draper, Jr., Oxford, Ala.

264,273. PNEUMATIC BELL-RINGING APPARATUS. — Robert P. Garsed, Norristown, Pa.

264,275. WINDOW-BLIND. — George P. Gee, Rochester, N. Y.

264,310. TRESTLE. — Thomas P. Maddox, St. Louis, Mo.

264,320. AUTOMATIC CUT-OUT FOR GAS-BURNERS. — Gill W. Metcalfe, Baltimore, Md.

264,332. LATHE FOR TURNING IRREGULAR FORMS. — Hollis C. Paine, Lynn, Mass.

264,334. BRICK-KILN. — Ernst E. Polster, Baltimore, Md.

264,345. FIRE-ESCAPE. — Chas. A. Schnell, Troy, O.

264,352. SAFETY-DEVICE FOR ELEVATORS. — Wm. Henry Skerritt, Jersey City, N. J.

264,386. GOVERNOR FOR ELEVATORS. — Charles S. Westcott, Philadelphia, Pa.

264,393. CUT-OFF FOR CISTERNS. — George Wilson, Vinton, Io.

264,898. BRICK-MACHINE. — Milton Wright, Fort Valley, Ga.

264,404. FIRE-ESCAPE. — Joseph P. Curry, Vincennes, Ind.

264,408. HEATING-APPARATUS. — Ephraim H. Graves, Morrison, Ill.

264,421. BEVEL-GAUGE. — Frederick H. Sweet, Williamsport, Pa.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report sixteen permits have been granted, of which the following are the more important:

John McMann, 2 two-st'y brick buildings, Wall St., between Wen and Ostend Sts.

G. W. Taylor, two-st'y brick shop, in rear of Greenmount Ave., north of Townsend St.

Jerry Noonan, three-st'y brick building, Hillen St., between Front and High Sts.

Michael Igo, three-st'y brick building, Doris St., between Bath and Pleasant Sts.

Jesse F. Hampton, 2 three-st'y brick buildings, Potomac St., between O'Donnell and Elliott Sts.

Jesse F. Hampton, 2 three-st'y brick buildings, Curley St., between O'Donnell and Elliott Sts.

John W. Woods, two-st'y brick building, Foster Alley, between Dolphin and Lanvale Sts.

Jacob Saum, 4 two-st'y brick buildings, Calverton Road, east of Smallwood St.

George D. Hartwig, 2 three-st'y brick buildings, Baltimore St., between Chester and Castle Sts.

Abbott Land Co., 17 two-st'y brick buildings, Canton St., between Tome and Elliott Sts.

Henry Hinck, three-st'y brick building, southeast cor. Bond and Eager Sts.

House of Good Shepherd, three-st'y brick building, southeast cor. Mount and Hollins Sts.

Boston.

BUILDING PERMITS. — *Brick. — Tremont St., No.* 159, Ward 10, for Mr. C. T. White, five-st'y mercantile, brick and stone, 26' x 83'; Weston & Shepard, builders.

Brookline Ave., rear of, near Beacon St., Ward 22, for Boston & Albany R. R. Corporation, two-st'y signal-house.

Wood. — East Fourth St., cor. Jay St., Ward 14, for Howard Clapp, three-st'y dwell., 30' x 45'; Howard Clapp, builder.

Norfolk St., near Walk Hill St., Ward 24, for Frederick Metzger, dwell., 18' x 24'; G. W. Adams, builder.

East Fifth St., No. 523, Ward 14, for Jas. V. Devine, one-st'y and mansard dwell., 21' x 31'; James V. Devine, builder.

East Fifth St., No. 553, Ward 14, for John Pringle, two-st'y dwell., 20' x 30'; D. A. Berry, builder.

Codman St., near Dorchester Ave., Ward 24, two-st'y dwell., 20' x 30'; Adam & John Law, owners and builders.

Codman St., near Dorchester Ave., Ward 24, two-st'y dwell., 21' x 29'; Adam & John Law, owners and builders.

Codman St., near Dorchester Ave., Ward 24, two-st'y dwell., 29' x 33'; Adam & John Law, owners and builders.

Walnut Ave., rear of, near Dale St., Ward 21, for Wm. Donaldson, owner and builder, stable, 15' x 22' and 22' x 28'.

Walnut Ave., near Dale St., Ward 21, two-st'y dwell., 17' x 18' and 22' x 32'; Wm. Donaldson, owner and builder.

Washington St., rear, nearly opposite Roslin Ave., Ward 23, for Dirk Hylwen, two-st'y dwell., 20' x 82'; John Albrecht & Co., builders.

Georgia St., near Montana St., Ward 21, for Isaac S. Chubbuck, two-st'y dwell., 20' and 36' x 48'; Wilson Bros., builders.

Prentiss St., Nos. 16 *and* 18, Ward 19, for Anna Julia Krone, two-st'y dwell., 27' x 34' 6"; Valentine Brock, builder.

Regent Sq., off Regent St., Ward 21, for Geo. L. Thayer, 2 dwells., 20' x 25' and 27'; James W. Lord & Co., builders.

Columbia St., rear of, near Main St., Ward 4, for John Driscoll, three-st'y dwell., 22' x 35'; E. J. Tully, builder.

Highland Park Ave., No. 10, Ward 21, for John P. Riley, two-st'y dwell., 32' x 46'; Felix J. Portunato, builder.

Princeton St., No. 38, Ward 3, for John C. Hunter, three-st'y dwell., 14' and 20' x 42'; John Hayes, builder.

Princeton St., No. 40, Ward 3, for John C. Hunter, three-st'y dwell., 14' and 20' x 42'; John Hayes, builder.

Blue Hill Ave., near Lawrence Ave., Ward 24, for Payson & Co., two-st'y stable, 40' x 80'.

Bowen St., No. 171, Ward 13, for James Daley, two-st'y dwell. and store, 16' x 28'; J. H. Wigglesworth and J. Drummey, builders.

A St., rear of, Ward 13, for Wm. H. Dole, two-st'y shop, 30' x 71' 6"; Mead, Mason & Co., builders.

Centre St., rear of, near Allandale St., Ward 23, for Trustees Adams Nervine Asylum, two-st'y hospital, 27' and 31' x 57', hip; Norton & Chesley, builders.

Washington St., opp Roslin St., Ward 24, for Jas. S. King, two-st'y dwell., 20' x 25' and 30'; Millner & Pinkham, builders.

Station St., near B. & P. R. R., Ward 22, for B. F. Cobb & Co., 2 lumber sheds, 22' x 34'; E. C. Benson, builder.

Condor St., near Putnam St., Ward 1, for Frederick Griffin, stable, 20' x 25'; Frederick Griffin, builder.

Elmore St., rear of, near Mayfair St., Ward 21, for L. L. & G. H. Whitney, stable, 22' x 36'; L. L. & G. H. Whitney, builders.

Lexington St., No. 240, near Prescott St., Ward 1, for George H. Libby, two-st'y mansard dwell., 21' 6" x 32'; George H. Libby, builder.

Border St., No. 290, rear of, Ward 1, for John F. Slattery & Co., lumber shed, 20' x 50', office, 10' x 16'; John F. Slattery & Co., builders.

Brooklyn.

BUILDING PERMITS. — *North Fourth St., No.* 174, being 100' Fifth St., five-st'y brick factory; cost, $8,500; owners, H. Muench & Son, on premises; architect, Th. Engelhardt; builder, M. Smith.

John St., n s, 48' e Jay St., eight-st'y brick storehouse and warehouse; cost, $50,000; owners, Arbuckle Bros., 62 Willow St.; architect and carpenter, F. D. Norris; mason, Thos. Donlon.

Franklin St., w s, 75' s Green St., four-st'y brick tenement; owner, A. Adler, Franklin St.; architect, F. Weber; builders, D. H. Hulse and A. J. Hulse.

North Tenth St., s s, bet. First and Second Sts., two st'y factory; cost, $3,500; owners, J. M. Farrington & Co.; architect and builder, G. A. Kingsland.

Evergreen Ave., e s, 75' s Myrtle St., three-st'y frame tenement; cost, $4,000; owner, Leopo d Michel, Ewen St., cor. Meserole St.; architect, G. Hillenbrand.

Interior lot, 150' w Washington St., and 50' n Front St., three-st'y brick factory; cost, $3,500; owners, Campbell & Thayer, 81 Front St.; builder, John Guilfoyle.

Broadway, n e cor. Fifth St., 5 four-st'y iron and brick business buildings; cost, $——; owner, Jas. R. Sparrow & Son, 106 Kent St.; architect, W. B. Ditmars; mason, S. J. Burrows; carpenter, not selected.

York St., s s, 125' e Jay St., four-st'y brick tenement; cost, $7,500; owner, John Dowling, 265 Wyckoff St.; architect, R. B. Eastman; builders, J. H. O'Rourke and Hartt & Boyd.

Magnolia St., n s, 75' e Irving Ave., three-st'y frame tenement; cost, $3,500; owner, architect and builder, James Williamson, 626 Gates Ave.

De Kalb Ave., n w cor. Kent Ave., three-st'y brick store and dwell.; cost, $4,000; owner, Chas. Messerle, De Kalb Ave., near Franklin Ave., builders, E. Sutterlin and G. F. Chapman.

Fairfax St., n s, abt. 300' e Broadway, three-st'y frame Home for Aged People; cost, $8,000; owner, Society in aid of the Aged, on premises; architect, Th. Engelhardt; builders, C. Dahuken and C. L. Johnson.

Beaver St., n s, 562' e Flushing Ave., 3 three-st'y frame tenements; cost, each, $3,200; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, Th. Engelhardt.

Beaver St., n s, 512' e Flushing Ave., 3 three-st'y frame dwells.; cost, each, $3,200; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, Th. Engelhardt.

Quincy St., n s, 325' w Throop Ave., 4 two-st'y brick dwells.; cost, each, $3,800; owner and builder, G. De Revere, 663 Greene Ave.

North Henry St., No. 37, bet. Meeker Ave. and Herbert St., 25' from Herbert St., three-st'y frame tenement; cost, $3,500; owner, August Winkler, 33 North Henry St.; builders, Jacob Schoen and J. Mesmer.

Broadway, Nos. 853, 855 *and* 857, e s, 48' s Ditmars St., 3 three-st'y brick tenements; cost, $5,500; owner and builder, Fred. Herr; architect, Th. Engelhardt.

Reid Ave., w s, 20' s Lafayette Ave., 2 three-st'y brick dwells.; cost, each, $3,300; owner, architect and mason, Jno. E. Sagar, 405 Evergreen Ave.; carpenters, J. M. Sagar & Sons.

Myrtle Ave., No. 1568, s s, cor. Palmetto St., three-st'y frame dwell.; cost, $11,000; owner, John Hincken, Church, cor. Walker St., New York; architect, Th. Engelhardt; builders, H. Westphal and L. Antonius.

Newell St., e s, 100' n Norman Ave., 3 three-st'y frame tenements; cost, $7,500; owner, architect and carpenter, Samuel Self, 142 Manhattan Ave.; mason, Israel Reed.

Fifth Ave., e s, 40' s Nineteenth St., 6 three-st'y brick stores and flats; cost, each, $5,500; owner, Mary A. Heartrung, 344 Van Brunt St.; architect, P. H. Gilvarry; builder, W. J. Conway.

ALTERATIONS. — *Willoughby Ave., No.* 703, three-st'y frame extension; cost, $3,000; owner, —— Longhi, on premises; architect, Th. Engelhardt; builders, W. Spence and A. McCurdy.

Chicago.

STORES. — Cor. Van Buren and Aberdeen Sts., will be built 2 stores and 3 dwells., 58' x 102', two-st'y brick front; cost, $18,000; Daniel Quill, owner.

On cor. Twenty-first St., and Centre Ave., four-st'y store and flats, 21' x 70'; cost, $9,000; Mr. H. McCarthy, owner; Mr. C. O. Hansen, architect.

BUILDING PERMITS. — H. H. Gage, three-st'y flats, 18' x 40', 109 N. Ashland Ave.; cost, $2,500.

Geo. Deacon, three-st'y and basement brick store and flats, 25' x 75', 2830 South State St.; cost, $10,000.

A. Johnson, four-st'y brick dwell., 22' x 40', 67 Fowler St.; cost, $3,000.

Wm. Collins, two-st'y and basement brick dwell., 23' x 48', 871 South Ashland Ave.; cost, $3,500.

H. Specht, two-st'y and cellar brick dwell., 21' x 56', 843 South Ashland Ave.; cost, $3,100.

F. Kabel, two-st'y and basement brick dwell., 22' x 60', 123 Townsend St.; cost, $4,000.

H. Vollrath, two-st'y and basement brick dwell., 25' x 88', 769 Twenty-first St.; cost, $6,000.

Chas. Passow, two-st'y and basement brick shop, 22' x 70', 176 Barber St.; cost, $2,500.

F. Leon, two-st'y brick flat, 30' x 55', Swing St., near Fulton St.; cost, $4,000.

J. B. Belohrodsky, two-st'y and cellar brick dwell., 20' x 53', 864 North Ashland Ave.; cost, $4,000.

D. Casey, two-st'y and basement brick store and dwell., 44' x 63', 2516 South Halsted St.; cost, $6,000.

Alexian Bros., two-st'y and basement brick hospital, 22' x 88', 546 Franklin St.; cost, $5,000.

Bryan Wadden, two-st'y and basement brick dwell., 22' x 42', Nassau and Van Buren Sts.; cost, $3,500.

Riverside Distilling Co., two-st'y barn, 264 and 266 Kinzie St.; cost, $4,000.

J. C. & L. D. Hammond, five-st'y and basement office-building, 42' x 62', 177 to 185 La Salle St.; cost, $25,000.

J. C. & L. D. Hammond, two-st'y addition, 45' x 50', 179 La Salle St.; cost, $5,000.

H. Paepcke, two-st'y and basement brick factory, 30' x 80', 480 Fifth Ave.; cost, $3,000.

S. A. Kent, two-st'y attic and basement brick dwell. and barn, 50' x 96', 2942 Michigan Ave.; cost, $40,000.

F. Heinze, two-st'y and basement brick dwell., 44' x 49', 181 Superior St.; cost, $5,000.

S. B. Williams, four-st'y and basement brick flats, 55' x 70', 113 and 115 Locust St.; cost, $35,000.

Trinity Lutheran Church, church-building, 45' x 96', 398 and 400 La Salle Ave.; cost $30,000.

F. Steiger, two-st'y dwell., 20' x 50', 14 N. Halsted St.; cost, $3,300.

W. Harder, two-st'y dwell., 25' x 54', 2838 Dashiel St.; cost, $3,500.

J. A. Koch, two-st'y dwell., 22' x 60', 182 Wright St.; cost, $4,000.

C. A. Rosenbamm, two-st'y dwell., 20' x 32', 678 W. Twentieth St.; cost, $2,600.

M. Corney, two-st'y dwell., 24' x 64', 3600 Wallace St.; cost, $3,400.

Rev. F. H. Skinner, two-st'y dwell., 38' x 40', 1038 N. Halsted St.; cost, $7,000.

James Bates, two-st'y store and dwell., 24' x 60', 676 Indiana St.; cost, $3,600.

A. Laush, two-st'y dwell., 22' x 51', 568 North Ave.; cost, $4,000.

H. W. Martin, two-st'y dwell., 20' x 59', 197 Third Ave.; cost, $3,500.

T. W. Eaton, two-st'y dwell., 39' x 47', 1447 Fulton St.; cost, $8,000.

M. J. Abbott, three-st'y dwell., 22' x 44', 91 S. Peoria St.; cost, $4,700.

F. Norrick, two-st'y store and dwell., 24' x 50', 99 Nineteenth St.; cost, $2,500.

D. E. Tracey, two-st'y shop, 21' x 58', 2749 Archer Ave.; cost, $3,000.

E. O. Hare, two-st'y shop, 21' x 58', 2446 Halsted St.; cost, $3,000.

P. Young, two-st'y flats, 24' x 60', 347 Burling St.; cost, $4,000.

James Foley, three-st'y dwell., 24' x 60', 210 Centre Ave.; cost, $7,500.

Thomas Parker, Jr., two-st'y dwell., 33' x 80', 1011 W. Monroe St., cost, $10,000.

B. Mueller, two-st'y factory, 43' x 90', 92 West Van Buren St.; cost, $9,000.

Jas. Freed, three-st'y dwell., 22' x 51', Oak and Franklin Sts.; cost, $6,000.

Thos. Notapinski, two-st'y store and dwell, 24' x 35', 543 Noble St.; cost, $2,500.

Benedictine Sisters, two-st'y school, Market near Hill Sts.; cost, $8,000.

J. J. Sherman, two-st'y dwell., 22' x 50', 360 Jackson St.; cost, $4,000.

Mrs. E. O'Brien, three-st'y flats, 46' x 82', 3540 State St.; cost, $6,000.

D. B. Shipman, two-st'y lead works, 50' x 100', 1516 State St.; cost, $10,000.

M. Pischa, three-st'y store and dwell., 22' x 66', 168 DeKoven St.; cost, $6,000.

F. Kubat, two-st'y dwell., 20' x 56', O'Brien and Union Sts.; cost, $3,000.

J. F. Doris, two-st'y flats, 55' x 308', Bissell St. and Webster Ave.; cost, $6,000.

J. Philbin, three-st'y flats, 25' x 60', 201 La Salle St.; cost, $10,000.

J. Johnson, two-st'y dwell., 27' x 64', Sheffield and Waubansia Aves.; cost, $2,800.

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J. Frading, two-st'y dwell., 21' x 46', 155 Sheffield Ave.; cost, $3,000.

A. Pearson, three-st'y store and flats, 55' x 75', Van Buren and Hermitage Aves.; cost, $18,000.

J. Petersen, two-st'y dwell., 21' x 50', Maxwell St. and Blue Hill Ave.; cost, $4,000.

A. Williams, two-st'y dwell., 40' x 44', 1076 Harrison St.; cost, $6,000.

Geo. Steggler, two-st'y dwell., 21' x 50', 912 North Halstead St.; cost, $3,600.

Therette Tresselt, three-st'y dwell., 20' x 60', 297 Lincoln Ave.; cost, $4,000.

Barbara Titus, three-st'y dwells., 60' x 120', 489 VanBuren Ave.; cost, $24,000.

John P. Ort, two-sty store and dwell., 22' x 44', 448 Twenty-sixth St.; cost, $4,000.

L. W. Yaggry, six-st'y apartment-house, 65' x 65', 148 Dearborn Ave.; cost, $80,000.

John Featherstone, three-st'y machine-shop, 72' x 111', Front and Halstead Sts; cost, $17,000.

F. Nerud, two-st'y dwell., 21' x 56', 666 Throop St.; cost, $4,000.

Cincinnati.

Building Permits. — Davis Phelan, 2 two-st'y brick dwells., Dane St., opp. Jones St.; cost, $5,700.

P. Eiginlant, two-st'y brick dwell., Vine St., near Milk St.; cost, $5,000.

Jos. Darmody, three-st'y brick dwell., Gilbert Ave. near State St.; cost, $2 000.

L. H. Wilson, three-st'y brick dwell., Plum St., near McFarlan St.; cost, $2,500.

Three permits for repairs; cost, $1,500.

Detroit.

Houses. — John Lynch, frame dwell., Cass Ave.; cost, $4,000.

Henry Stringer, frame house, Baker St.; cost, $3,000.

A. Beaton, frame house, Grand River Ave.; cost, $2,400.

W. C. Claxton, frame house, No. 497 Third St,; cost, $4,000.

Two brick dwells., Nos. 691 and 693 Cass Ave.; cost, $9,000; A. C. Varney, architect.

Frame dwells., Warren Ave.; cost, $4,000; A. C. Varney, architect.

Brick boiler-house, No. 140 West Fort St.; cost, $2,000; A. Chapoton, Jr., contractor.

Frame house, No. 20 Hancock St.; cost, $2,500; A. B. Cram, architect.

Stores. — Francis Palms, 10 brick stores, Gratiot St.; cost, $30,000; G. W. Lloyd, architect; A. Chapoton, Sr., and Nuppenan & Clark, contractors.

James E. Scrips, brick store, No. 70 West Larned St.; cost, $12,000; G. W. Lloyd, architect.; A. Moross, contractor.

A. E. Hamblin, brick store and dwell., West Fort St.; cost, $6,500.

Engine-House. — City of Detroit, brick engine-house, Sixteenth St.; cost, $11,000; Wm. Stott, & Co., architects.

Barn. — A. Backus, brick barn, Woodbridge St.; cost, $2,000.

Storehouse. — To enlarge brick storehouse, cor. Orleans and Clinton Sts.; cost $4,000; A. C. Varney, architect.

New York.

Office-Building. — For the Williamsburg City Fire Insurance Company, a building 25' 3" x 110' 4", with ell, 20'x 48', is to be built at the corner of Broadway and Liberty St. It is to be eight stories high; the basement will be of Quincy granite, the first floor of Westerly, and above the front will be of brick, brownstone and terra-cotta. The cost will probably be about $150,000; Mr. F. Chas. Merry, architect.

Contract.—The contract for building the Bachelors' Apartment-house at the corner of Fifth Ave. and Forty-second St. has been awarded to Messrs. Jas. B. Smith, Prodgers & Co.

Church.—The work of rebuilding the interior of the Protestant Episcopal Church of the Incarnation, at the n e cor. of Madison Ave. and Thirty-fifth St. in this city, which was entirely destroyed by fire a few months ago, has been begun.

Exchange Building. — The New York Mercantile Exchange has purchased three lots on the cor. of Harrison and Hudson Sts. in this city, for $70,000, on which they are going to erect a building.

Building Permits.—*Cherry St., Nos.* 198, 200 *and* 202, two-st'y brick stable; cost, $10,000; lessee, George V. Hecker, 278 Madison Ave.; architects, Wm. Field & Son.

Ave. B, s w cor. Sixteenth St., five and six st'y brick apartment-house; cost, $100,000; owner, Hugh Smith, Bowery, cor. Thirty-fourth St.; architect, S. D. Hatch.

Spring St., No. 169, five-st'y brick store and lofts; cost, $18,250; owner, William S. Hicks, 20 Maiden Lane; architect and builder, J. M. Grenell.

East Sixty-ninth St., No. 159, brick and Nova Scotia brownstone stable; cost, $16,000; owner, John Sloane, 997 Fifth Ave.; architect, C. W. Romeyn; builders, J. & G. Ruddell and A. C. Hoe & Co.

East Fifty-fourth St., Nos. 334, 336, 338, 340 *and* 342, 5 five-st'y brick tenements; cost, each, about $12,000; owner, James Duffy, 228 East Fifty-first St.; architect, A. Spence.

Lexington Ave., s w cor. Ninety-fourth St., 6 four-st'y brownstone tenements; cost, each, $10,000; owners, Stone & Healing, 222 East Seventy-sixth St.

Eighty-seventh St., s s, 90' e Second Ave., 8 brick and Nova Scotia brownstone dwells.; cost, each, $8,000 and $9,000; owner, Mrs. Mary R. Stewart, by W. R. Stewart, 54 William St.; architect, H. J. Hardenbergh; builders, D. & E. Herbert and Grissler & Fausel.

Eighty-seventh St., s s, 135' 5" e Second Ave., four-st'y and 4 three-st'y brick and brownstone dwells.; cost, each, $8,000, and $9,000 for one; owner, Miss Serena Rhinelander, by W. R. Stewart; architect and builder, same as last.

Third Ave., n e cor. Sixty-eighth St., five-st'y brick and Nova Scotia stone store and tenement; cost, about $35,000; owner, F. Aug. Schermerhorn, 68 Wall St.; architect, H. J. Hardenbergh; builders, Marc, Eidlitz and Jas. Elger.

Third Ave., e s, 24' 5" n Sixty-eighth St., 2 five-st'y brick and stone stores and tenements; cost, each, about $35,000; owner, architect and builder, same as last.

Third Ave., e s, 24' 5" s Sixty-ninth St., 2 five-st'y brick and stone stores and tenements; cost, each, about $35,000; owner, Wm. C. Schermerhorn, 68 Wall St.; architect and builder, same as last.

Third Ave., s e cor. Sixty-ninth St., five-st'y brick and stone store and tenement; cost, about $35,000; owner, architect and builder, same as last.

Forsyth St., No. 72, five-st'y brownstone tenement; cost, $15,500; owner, Julius Steffens, 33 Bowery; architects, H. J. Schwarzmann & Co.; builder, W. J. Gessner.

Eighth Ave., e s, 25' n One Hundred and Twenty-third St, 2 five-st'y brick stores and tenements; cost, $11,000; owner, Henry G. Peters, 57 East One Hundred and Twenty-fourth St.; architect, B. Walther; builder, John Meehan.

One Hundred and Fiftieth St., n s, 50' e of German Pl., three-st'y frame tenement; cost, $3,500; owner, Eliza Naughton, 49 West Twenty-sixth St.; builder, J. E. Naughton.

West Thirteenth St., Nos. 55 *and* 57, three-st'y brick store and dwell.; cost, $10,000; lessee, James Pursell, Jr., 52 West Fourteenth St.; architect, C. E. Hadden.

East One Hundred and Twenty-fifth St., No. 170, 2 one-st'y frame stores; cost, each, $3,500; lessee, Wm. A. Martin, 537 Seventh Ave.; builder, John Van Dolsen.

Allen St., e s, 75' n Rivington St., 2 five-st'y brick stores and tenements; cost, each, $10,000; owner, P. Henry and Francis A. Dugro, 56 St. Mark's Pl.; architect, F. W. Klemt.

Willis Ave., n w cor. One Hundred and Fortieth St., three-st'y frame stores and tenement; owner and builder, Augustus Gareis, cor. Willis Ave. and One Hundred and Forty-first St.; architect, Bart. Walther.

One Hundred and Seventeenth St., n s, 100' e First Ave., 4 four-st'y brick tenements, cost, each, $12,000; owner, C. Johnson, 101 East One Hundred and Nineteenth St.; architect, R. Rosenstock.

Worth St., s w cor. Chatham St., six-st'y brick, iron and sandstone store and lofts; cost, $40,000; lessee, David Rothschild, 42 Division St.; architects, H. J. Schwarzmann & Co.; builders, J. & L. Weber and Henry Schiffer.

Suffolk St., w s, 100' n Grand St., brick and terra-cotta church; cost, $30,000; owner, Emmanuel Baptist Church, care J. A. Bostwick, 44 Broadway; architects, D. & J. Jardine.

One Hundred and Eighth St., n e cor. Lexington Ave., 21 four-st'y brownstone tenements; owner, Elizabeth Meehan, 131 East One Hundred and Ninth St.; builder, H. Meehan,

Second Ave., e s, extending from One Hundred and Tenth St. to One Hundred and Eleventh St., 10 five-st'y brick stores and tenements; cost, each, $10,000; owner and builder, same as last.

Alterations.—*Wall St., No.* 7, internal alterations, etc.; cost, $5,000; owner and architect, W. Wheeler Smith, 7 Wall St.; builders, J. J. Tucker and J. L. Smith.

James St., No. 26, front and rear, partitions removed and rearranged; cost, $7,000; owner, St. James R. C Church, James St.; architect, Wm. H. Hume; builders, James Slevin and Mahony Bros.

East Forty-first St., No. 46, to be raised one st'y; cost, $3,500; owner, Theron R. Butler, 433 Fifth Ave.; architects, D. & J. Jardine.

One Hundred and Sixth St., s s, 200' e First Ave., one-st'y brick extension; cost, $4,000; owners, Nathan & Dreyfus, 92 Liberty St.; architects, H. J. Schwarzmann & Co.; builders, List & Lennon and John F. Moore.

East Eighty-eighth St., Nos. 157 *and* 159, to be raised two stories; cost, $6,000; owner, Henry Schiffer, 214 East Eighty-seventh St.; architect, J. Kastner; builders, J. & L. Weber.

Hester St., No. 71, attic to be raised to full story, also, three-st'y brick extension and store front to basement; cost, $3,500; owner, Rosa Flack, 61 Hester St.; architect, John Brandt, builder, Ph. Kottlowski.

Philadelphia.

Building Permits. — *Jefferson St.*, n s, between Twenty-fifth and Twenty-sixth Sts., one-st'y schoolbuilding, 26' x 45'; Chas. Beiteminiller, contractor.

Susquehanna Ave., s s, w of Ninth St., 10 three-st'y dwells., 17' x 44'; Jno. S. Serrill, owner.

Diamond St., n s, w of Percy St., 3 three-st'y dwells., 17' x 44'; J. S. Serrill, owner.

Worth St., n s, between Margaretta and Orthodox Sts., 5 two-st'y dwells., 15' x 40'; Richard Winnals, contractor.

Adams St., e s, between Terrace and Sharp Sts., 5 two-st'y dwells., 14' x 32'; Thos. Hagerty, contractor.

Fleming St., s s, e of Cotton St., 3 two-st'y dwells., 12' x 32'; C. J. Wallace, contractor.

Cresson St., n s, e of Adams St., three-st'y dwell., 16' x 32'; Robt. Manly, contractor.

Cresson St., n e cor. Hermit St., 2 three-st'y dwells., 16' x 32'; Robt. Manly, contractor.

Cedar St., near Terrace St., three-st'y dwell., 16' x 50'; Robt. Manly, contractor.

Sumac St., e s, near Wissahicken Station, 2 three-st'y dwells., 18' x 63'; Robert Manly, contractor.

Mifflin St., n s, e of Eleventh St., 6 three-st'y dwells., 13' x 30' and 14' x 30'; Jas. Fraiser, owner.

Clementine St., n s, e of Amber St., 4 two-st'y dwells., 15' x 28'; Dickson Bros., contractors.

Germantown Ave., No. 2033, three-st'y store and dwell., 16' x 108'; H. M. Martin, contractor.

York Pike, below Green Lane, three-st'y store and dwell. and three-st'y dwell., 25' x 47' and 45' x 48'; Jacob Rorer, owner.

Lesher St., w s, between Meadow and Orthodox Sts., one-st'y foundry, 31' x 52'; S. W. Evans & Son, owners.

Terrace St., s w cor. Loftis St., 2 two-st'y dwells., 17' x 33'; Chas. Dougherty, owner.

Main St. (Frankford), No. 4507, three-st'y store and dwell., 19' x 70'; L. Schaub, contractor.

Eleventh St., cor. Lehigh Ave., one-st'y church, 67' x 76'; Jno. Mauder, contractor.

Sixty-first St., w s, s of Pine St., 2 two-st'y dwells., 14' x 32'; Jacob Zell, contractor.

Seventh St., s of Indiana Ave., 3 two-st'y dwells., 14' x 28'; F. Heffling, contractor.

Fifth St., n, *No.* 2512, three-st'y dwell., 18' x 60'; F. Heffling, contractor.

O'Neill St., No. 1120, three-st'y dwell., 15' x 36'; A. F. Rau.

Fifty-second St. and Pennsylvania Railroad, three-st'y train-house, 27' x 47'; Wm. Smith, contractor.

Fifth St., w s, n of Indiana Ave., three-st'y dwell., 17' x 42'; C. H. W. Keyser, contractor.

James Ave., cor. Houghton St., 2 two-st'y dwells., 16' x 46'; Sylvester Yardley, contractor.

Pratt St., n w cor. Melrose St., 2 three-st'y dwells., 15' x 42'; Thos. Waters, contractor.

Colton St., n s, between Wood and Cresson Sts., church-building, 40' x 60'; Edward Struce & Son, contractors.

Point Breeze, two-st'y office-building and second and third st'y addition to factory, 20' x 40' and 100' x 100'; Atlantic Refining Co., owners.

Terrace St., e s, n of Hermit St., 2 three-st'y dwells., 18' x 32'; Wm. Goodfellow, contractor.

Bread St., w s, between Richmond and Washington Sts., three-st'y dwell., 20' x 44'; A. W. Linn, contractor.

St. Louis.

Building Permits.—Thirty-two permits have been issued since our last report, of which eleven are for unimportant frame dwellings. Of the rest, those worth $2,500 and over are as follows:—

A. Wilbrandt, two-st'y brick dwell.; cost, $4,300; contractor, A. Wagner.

Jas. Noonan, two-st'y brick dwell.; cost, $2,500; contractor, — Fischer.

F. H. Ludington, two-st'y brick dwell.; cost, $15,000; architect, A. Grable; contractors, Dan. Evans & Bro.

J. W. Roth, two-st'y brick dwell.; cost, $2,800; contractor, J. Schaffner.

P. Meyer, three-st'y brick store and dwell.; cost, $7,000; architect, A. Beinke; contractors, B. Weber & Co.

J. A. Bauer, two-st'y brick store and dwell.; cost, $7,500; sub-let.

Wm. Madley, two-st'y factory; cost, $3,000; contractor, Wm. Madley.

M. E. Whitemore, three-st'y brick dwell.; cost, $6,500; architect, J. A. Conlon; contractor, M. E. Whitemore.

W. T. Walker, two-st'y brick dwell.; cost, $2,600; contractors, Kerr & Allan.

A. J. Rockwell, two-st'y brick dwell.; cost, $7,000; architect, J. H. Maurice; contractor, J. H. Maurice.

Washington.

Building Permits. — Metropolitan Club, three-st'y and basement brick club-house, 62' x 76', cor. Seventeenth and H Sts., n w; cost, $35,000.

Joseph Luckey, 4 four-st'y brick dwells., 22' x 36', North Capitol St., cor. C St.; cost, $15,000.

Mrs. Annie E. Rodgers, three-st'y and basement brick dwell., 27' x 59', N St., between Seventeenth and Eighteenth Sts., n w; cost, $16,000.

M. J. Shaw, two-st'y and basement brick dwell., 20' x 30', Massachusetts Ave., between Seventh and Eighth Sts., n w; cost, $3,300.

Mrs. M. Peet, three-st'y and basement brick dwell., 25' x 38', New Hampshire Ave. and Dupont Circle, n w; cost, $8,500.

Mary E. Haines, three-st'y and basement brick dwell., 20' x 33', H St., between Tenth and Eleventh Sts., n w; cost, $2,000.

P. W. Page, 2 three-st'y and basement brick dwells., 20' x 60', Connecticut Ave. and R St., n w; cost, $14,000.

Anton Heitmüller, 4 four-st'y brick dwells., 18' 6" x 43', Thirteenth St., between Q and R Sts., n w; cost, $12,000.

General Notes.

Arlington, Mass. — Additions and alterations are now in progress on the Arlington Congregational Church, from plans of Messrs. Hartwell & Richardson, architects, of Boston.

Avondale, O. — Mr. Samuel C. Tatirn will build a frame and shingle dwelling; cost. $12,000. Mr. Jas. McLaughlin, of Cincinnati, architect.

Cottage City, Mass. — The corner-stone of the new Trinity Episcopal Church, the parent church of Martha's Vineyard, was laid last week with appropriate services. The new church will be 46' x 73', and have a seating capacity of 250 people. Cost, about $5,000.

Far Rockaway, L. I.—Three cottages are to be built for Mr. P. Donahue; two for Mr. Wm. McKenna; one for Mr. Joseph Warren, and one for Mr. Chas. Webster. All from designs of Mr. Jos. M. Dunn, of New York.

Haverhill, Mass. — The corner-stone of the new First Baptist Church was laid September 8.

Kansas City, Mo. — Hoore, Rhodes & Co., four-st'y brick building, 65' x 120', at Hickory St. and Kansas Ave., to cost $16,000.

J. H. Fink, three-st'y brick building, 45' x 80', at St. Louis and Union Aves., to cost $5,000.

Kennebunkport, Me. — A frame cottage is now being built for Mr. Frank W. Sprague; Messrs. Lewis & Clark, of Boston, architects.

Plymouth, Pa. — The corner-stone of a new Catholic church was laid September 3.

Pt. Gibson, Miss. — A small brick church, 400 sittings, is now being built from plans of Messrs. Ion Lewis & H. P. Clark, architects, of Boston, Mass.

Seabright, N. J. — A handsome frame cottage, to cost about $30,000, is to be erected for Mr. Geo. S. Scott, from designs of Messrs. Bruce Price & Freeman, of New York.

Spesutia Island, Md. — Messrs. C. L. Tunis & Co., contractors, are building a residence on Spesutia Island, head of the Chesapeake Bay, for Mr. C. W. Middleton, of Philadelphia; cost, $10,000.

Waltham, Mass. — The American Watch Company is about to build a large brick stable and carpenter-shop.

Yonkers, N. Y. — A residence is to be built on Broadway, for Mr. Geo. Preene, from designs of Messrs. Silliman & Farnsworth, of New York.

Industrial.

North Adams, Mass. — The Arnold Print Works, which a week or so ago began a mill, 113'x 225', have staked out in the yard in front of their main works a building, 40' x 100', two stories.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. NO. 353.

SEPTEMBER 30, 1882.

Entered at the Post-Office at Boston as second-class matter.

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MR. CLARENCE COOK, in his essay in the *North American Review*, makes the assertion, that "The general excellence which marks the dwellings of any people is a proof of the non-existence of professional architects among that people," and further, that "where architects abound the art of building always deteriorates." In support of this he cites the structures of colonial and revolutionary days, in many of which, as he truly says, "there is a sense of proportion, of picturesqueness, and of comfort," in which the dwellings of the present time "are particularly wanting;" and he calls attention to the fact that all those structures were the work of "simple builders, who knew their trade, and never cared to give themselves a finer name." Continuing his argument, he says that "Architects may have designed the bad houses of Venice, but never the good ones," a statement which, to say the least, seems to need qualification, and refers, this time with justice, to the Swiss châlets, as examples of a kind of building which owes nothing to culture, science, or archæology, and yet exhibits in its direct and skilful satisfying of the conditions imposed by local circumstances and taste, a degree of that beauty of fitness known as "style" which no other modern architecture can surpass. Mr. Cook is not the first to make such observations; in one form or another they have been repeated a score of times within as many years; and although the form which they have generally taken, of more or less ignorant and foolish abuse of architects, has prevented them from receiving much consideration, it may be worth while to reflect a moment on the subject, to see, if we can, whether there is real ground for them, and if so, whether something may not be done to remove such an imputation from a profession equal to any in the ability, industry and devotion of its members.

THAT the buildings of the Colonial period often possess a character of picturesqueness, proportion and comfort, which we find it easy to appreciate, but not to reproduce, must, we think, be acknowledged; but that this is more the fault of the architects than of the modern habits of life we venture to doubt. One who studies Colonial architecture is apt to be constantly surprised, not at the simplicity with which the problems of house-building were met, but at the sacrifices of convenience which our forefathers made for the sake of external effect. Fond as we profess to be of picturesqueness in the design of houses, we doubt whether any architect of the present day could persuade a client into reducing the height of his kitchen at one end to four or five feet, as was often done a hundred years ago, apparently with the sole object of including it with the rest of the house under that broad sweep of roof whose beauty we seek in vain to reconcile with modern requirements; or whether he could plan a building with ceilings crossed by beams less than six feet from the floor, or steps at unexpected intervals in the passages, such as we admire so much in our ancestors' houses, without forfeiting the esteem of his contemporaries. Moreover, the architects of the present day, in endeavoring to give to their designs the air of substantial comfort which characterizes the mansions of the Revolutionary period, are confronted with an insurmountable difficulty, in the form of the duty now imposed upon them of attaching piazzas or porches to their houses. It is useless to upbraid a man for failing to give to a structure surrounded by piazzas the look of pleasant solidity which a square building may have without them; the problem is not perhaps insoluble, but at least it has never yet been solved; and those proprietors who wish to be comfortable in hot weather must consent to a sacrifice of the architectural dignity of their mansions at other times.

CONCERNING the superior beauty of proportion often shown in the early houses Mr. Cook speaks with more reason, and we freely confess that the details of wood-work were as a rule much better designed and executed a hundred years ago than they are now. For this there are several reasons, of which the principal one is that in those days only one style of architecture was in use, and every one who undertook to manage a moulding plane was obliged to learn by heart, out of Sir William Chambers's, Batty Langley's, or Peter Nicholson's books, or from his master during his years of apprenticeship, the forms and proportions of frieze, cavetto, bed-mould, corona, cymatium and fillet, until a well-designed dentil cornice or pulvinated frieze was an easy task for every carpenter. The correct proportions of doors, windows, architraves, pilasters, pediments and panels were in the same manner duly laid down in the books and committed to memory by all intelligent builders, to be applied in practice on occasion. There was no demand for originality, and design consisting in the repetition of a set of well-known details, it was only natural that the execution of these details should reach a remarkable perfection. The constant contemplation of classical examples and the practice of classic work brought with it that sense of proportion and elegance which the study of ancient art never fails to develop, and so long as the style remained in fashion it was practised with increasing success. Not long after the outbreak of the Gothic crusade in England the fever reached our shores, and this event proved the signal for a rapid decline in taste. The bonds of the classical rule were broken; there was nothing, and has been nothing since, either to restrain the aberrations of importunate vulgarity or to serve as a basis for the progress of those who possess taste and skill. That it will be always so we do not believe: sooner or later the vagaries of our present architecture will resolve themselves, by the survival of the fittest, into an accepted style, upon which the genius of successive generations can work effectually to purify and animate, until it is fitted to be the noblest expression of that great American art-impulse of which the first signs are unmistakably visible among us.

DR. J. C. PETERS, of New York, seems to have taken up earnestly the discussion as to the sanitary condition of Newport, where his family have spent many summers, and publishes in the New York papers some letters of severe, but apparently honest condemnation of the slovenly ways which still prevail in the town. His strictures, as he explains, are not intended as volunteer criticisms on matters in which he has no personal interest, but are published in the hope of promoting a reform which will benefit his immediate family as well as others. His own cottage, which is on Church Street, near Bellevue Avenue, was this year, as he says, in almost perfect sanitary condition, but that did not save him from being much annoyed by the vicinity of premises of a very different character. The next house to his was occupied by the Newport Club, which maintained what he calls "five outrageous nuisances" during most of the season; less than a hundred feet away was a filthy cab-stand, which no attempt was ever made to clean; and at about the same distance was the open man-hole of a sewer catch-basin full of a liquid so offensive as to have made the nearest house unhealthy for many years. Some of his family took their meals at a celebrated restaurant on Bellevue Avenue, near Kay Street, and here he found a huge privy which had not been emptied, much less cleaned out, for two years, and will not be for several years to come if its owner continues in his present frame of mind; while his pleasure excursions in the harbor, and even his walks to and from church, were disturbed by various offenses to his eyes and nose. Dr. Peter's attitude in regard to such things is one with which many persons will sympathize. He acknowledges that he always makes a sanitary inspection of the neighboring premises on arriving at Newport, and says that if his neighbors will keep their stenches and nuisances on their own grounds, and not allow any of them to

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come into his, he will be content, but that he resents stenches coming over into his premises just as he would if those responsible for them were to throw their filth and garbage over his fence. If every one had the same conception of his rights, there might be more quarrelling among neighbors, but the public health would gain. That Newport is bad enough in these matters most persons familiar with the old town can testify, but there are very many other cities which are little better.

The competition of designs for the Capitol of the State of Texas, which took place a year or two ago, seems to have had a sequel which, though disagreeable to those interested in the building, was perhaps not so far from what might have been expected. We remember little of the terms of the competition beyond the amusement which they excited among architects, but our impression is that the profession was expected to contribute a large number of complete sets of working drawings, specifications and estimates, worth, if made with any approach to the necessary skill and care, at least twenty thousand dollars apiece, and from among these one was to be chosen for purchase by the State, at the lavish expense of twelve hundred dollars, if our memory serves us; and with the additional proviso that payment should be made out of the proceeds of some future sales of public lands, these very public lands being then in litigation, and likely to remain so for an indefinite period. It is marvellous that even an apology for a design should have been received in response to such an invitation, but it would seem that more than one was sent in, for the commendable step was taken of inviting the aid of Professor Moser, of Atlanta, as an expert adviser in deciding among them. No doubt his counsel was good, and it is only to be regretted that more of it was not asked for. However, the construction of the building was begun, and carried on rapidly — or would have been had not a portion of the walls unexpectedly fallen down just as the roof was ready to put on. The people who lived near were naturally alarmed, and an investigation was made by experts into the causes of the catastrophe. According to the account in the New Orleans *Picayune*, the report of these experts passes lightly over the circumstances which led to the accident, but makes the tolerably sweeping recommendation that "the entire north and west walls be taken down and strong ones substituted," and that "the entire roof be condemned;" supporting their advice by the prediction that if the present construction is allowed to proceed the building "will in five years be unsafe, and dangerous to persons passing near." We had thought that the spectacle of the Minnesota State-House blazing like a heap of straw, with the frightened legislators crawling for their lives out of the windows, must have been one of the most humiliating that the citizens of a self-respecting community could witness; but even a state-house of laths and furring is a creditable object compared with one whose roof, supported with difficulty on its tottering walls, daily threatens to collapse over its occupants, while the passers-by move in a wide circle around it, not out of respect for the seat of government of a State nearly as large as the whole of France and Italy combined, but from fear lest the masonry which encloses it should suddenly bulge in one direction or another and tumble on their heads.

The great strike of the iron-workers in the Pittsburgh district has ended, the men returning to their places at the old rates, after a voluntary suspension of business for one hundred and eleven days, and a sacrifice of more than ten millions of dollars in wages. Although the strike has been one of the longest on record, it has been conducted on the part of the men with moderation, and, latterly, with good sense. The formal ending of the struggle was decided by the vote of delegates from all the districts interested, who, as it was understood they would do, voted by a majority of three to one to return to the old scale. It is reported that certain manufacturers, elated by their victory, propose, while paying substantially the wages asked for, to reject the sliding scale altogether, and refuse any recognition of the Amalgamated Association. This, it seems to us, would be an action more foolish than any which the striking workmen have been guilty of. Even if it were desirable to destroy the Association, which is, to say the least, doubtful, the way to do so is not to declare open war against it on a trivial pretext, and if masters and men would only think so, both classes might, with advantage, be joined in a body whose object ought to be the promotion of the best and most economical methods of conducting that great industry, with a view to the prosperity of all concerned in it.

Accounts of damage to property from electric-light wires have become almost too common to attract notice. Within a few weeks the Paris Opera-House has been set on fire in this way; two incipient conflagrations in the Boston & Albany Railroad Station in Boston have been checked just before they became uncontrollable, and the telegraph apparatus at two New York police stations has been destroyed by the crossing of the line with that of an electric-light. It seems almost time that some steps were taken to guard the public against the carelessness of the electric-light companies in running their lines. It is probably true, as they assert, that fires caused by electricity are far less frequent than those caused by gas-lights; but that does not excuse them for exposing other people even to a small danger, and the risk from electric currents has the unpleasant quality that it is usually impossible to guard against it. A careful man can turn out all the gas-lights and cover up the fires in his house for the night, and sleep in tolerable security until morning, but if he has a telephone or telegraph connection in the building he can never know how soon the current from an electric-light wire a mile or two away may descend upon him, and without warning set his dwelling in a blaze. This risk, with that from lightning, has done much to restrict the use of telephones in suburban and rural districts, where help in case of fire is at a distance, and it would be for the interest of the numerous telephone companies to devise some effectual means for guarding against both forms of danger.

M. Auguste Bartholdi, a sculptor whose reputation interests Americans almost as much as his own countrymen, is mentioned in the French journals as having been recently advanced to the grade of officer of the Legion of Honor. This new distinction is probably connected with the completion of his very successful statue of Rouget de l'Isle, just inaugurated at Lons-le-Saulnier, an important manufacturing town in the Department of Jura. His greatest work, the statue of Liberty to be presented to the city of New York, will, when it is finished, probably earn for him still higher honors from his countrymen, although the persons upon whom it is to be bestowed have thought fit to accept it in a manner as churlish and contemptuous as the intention of the givers was delicate and generous.

A terrible engine of war has been invented, and has already been tested with success in England, in the shape of a moving submarine torpedo which can be controlled and directed from the shore. All those interested in such subjects know something of the Whitehead and Lay torpedoes, which are driven through the water by the action of compressed air stored up in their interior, and if directed with accuracy will explode upon coming in contact with the hull of the vessel to be attacked; but they have the serious fault of being beyond control after they leave their starting point, so that if a current should deflect their course to one side or the other of their intended victim, they keep on indefinitely, and are lost, or may even inflict injury upon friends instead of enemies. The new machine, on the contrary, can be turned in any direction at the will of the operator, and is readily stopped at any point, started again or drawn back, the explosion being effected only when the torpedo has reached a satisfactory position. All this is accomplished by very simple means. The torpedo, of cylindrical shape, and pointed at each end, is furnished with two small propellers, geared to cross shafts, around each of which is wound a fine wire rope of great length. On the shore is stationed a light windlass, driven by a steam-engine or any other motor, and having a velocity at the periphery of the drum of about one hundred feet per second. On placing the torpedo in the water, and starting the windlass so as to pull in the line wound about the shafts, a rapid movement is imparted to the propellers, and the machine, instead of being instantly hauled backward out of the water, is driven forward at a speed of fifteen or twenty miles an hour as long as the windlass continues to turn. The duplication of the ropes gives an opportunity for steering, and a light insulated wire affords the means of sending an electric spark to fire the dynamite or other explosive contained in the torpedo. The weight of the wire would limit the effective range of this formidable weapon, but it has been sent a third of a mile successfully.

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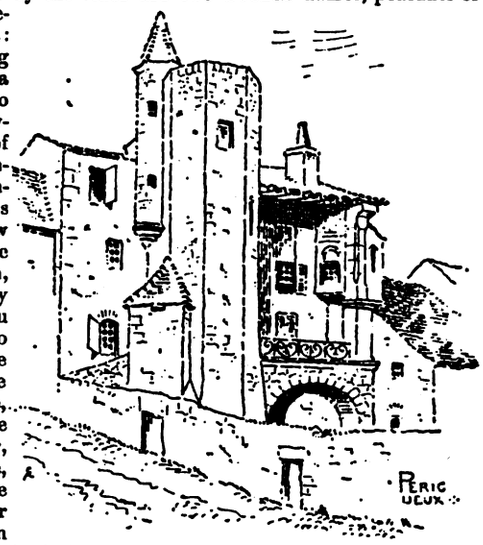
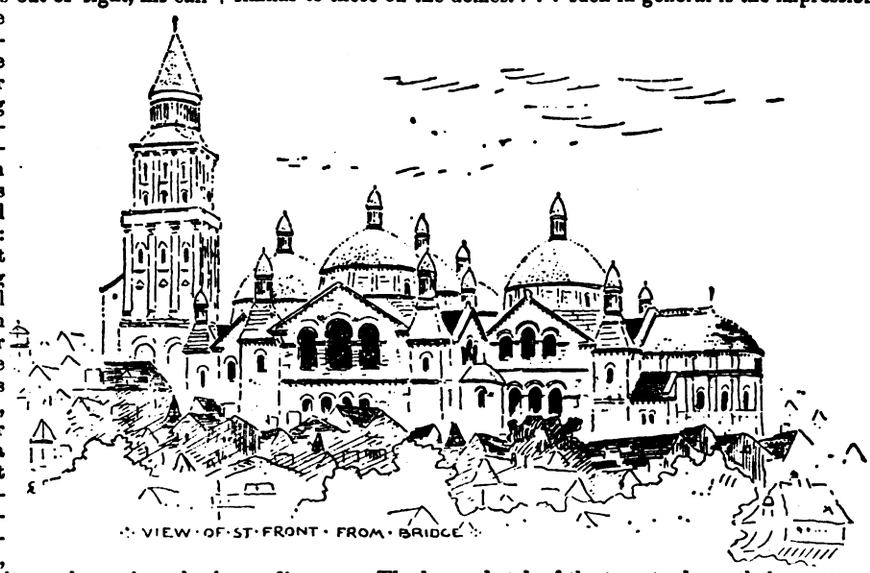
PERIGUEUX.

HERE are fifty slips of paper each bearing the name of an extremely interesting town or section of southern France. Pick out one: it bears the name of Périgueux, a town situated on the right bank of the river l'Isle, and composed of streets narrow, tortuous, extremely dirty, and hence correspondingly picturesque. A town noted for its celebrated *pâtes de Périgueux*, which tickle the stomach of the gourmand, — strong enough to walk to a county fair and register themselves, and which form quite an article of export.

We arrive there late one beautiful Saturday afternoon just as the sun is sinking over the hills, throwing deep shadows against the old walls and buildings and bringing out in deep relief the towers and turrets which seem to crop out from above the old tiled roofs. The river flows dreamily along its course, while the three bridges, old and moss-covered in places, cast their long deep shadows against the black stream, the whole scene a picture of lazy independence. Streams of workmen clank along the streets in their wooden *sabots*, women with huge bundles on their heads and the same huge wooden *sabots* on their feet are taking away their wares for the night, while along the *quai* the better class of peasants sit at the little open café, sip their wine, and discuss the latest topic of interest.

Such, in short, is the impression upon our minds. Suppose we sit down at one of the little tables which overlook the river, and under the influence of a bottle of *vin ordinaire* become one of the people: a half-hour here will show us more of the character and condition of the people of these little provincial towns than the reading of a dozen books. We are in a sort of annex to a large and beautiful château, which is now in a state of neglect, and of which a sketch is made later; before us are two high wooden columns holding up the roof of our balcony, and over which clamber vines in rich profusion. Below is the river, and immediately at the right is one of the old bridges. Our neighbors, meanwhile, are talking excitedly together, — evidently a little politics has entered into the conversation, and the name of Napoleon calls forth from one a shrug of the shoulders, or a spontaneous "*vive la Republic.*" While talking, away in the distance we hear the notes of the bugle calling the soldiers to their barracks: nearer and nearer it comes, until at last the bugler passes under the balcony and his notes grow more and more indistinct as he recedes. His figure has recalled to our minds, both in color and pose, the charming pieces of Détaille which seem only to need the breath of life to set the whole scene in action. But our bugler is out of sight, his call has died away in the distance, and the bottle is empty: this half-hour's scene has become indelibly fixed in our minds, and we return to the hotel for dinner. The next day is Sunday, clear and warm. It seems as if it might be interesting to hear the service in huge St. Front cathedral, and in order to reach the church it is necessary to pick our way through a half-dozen narrow little streets lined with picturesque bits of architecture. There stands an octagonal tower, off from which springs a circular turret: evidently a strongly-fortified dwelling of ancient date, and well secured against attack. Peering around a corner, guarded by a high stone-wall overgrown with moss and grass, another high tower comes full into view. Unlike the former it has no cornice whatever, but the roof of the building to which it is attached projects with its locked tiles far out, and forms a huge balcony, under which at one time was a huge circular arch of noble dimensions. Conjure up now a romantic bit of fancy, even a Romeo and Juliet scene if you please, and this old balcony becomes extremely interesting. Another old fortified house has been turned over to grape-culture, and a charming garden-terrace it makes, too. This tower is square, and fully half of it overhangs into the street below, and is held by a beautiful corbel and a couple of stone brackets. Just look at the huge battering wall, pierced with a single slit window; look up above and you will see a little scene which we saw: half hidden by the vines are two French dames, peasants or ladies of high degree it matters not: they are laughing and talking to a youth below, who seems to have given up all thought of business and turned his whole attention to the fair ones before him; now turn on the pale light of the moon, together with any poetic effusion you may chance to know, add all the *amour* it is possible for you to imagine, and the romance of this old tower, like the other one, is complete. Shake yourself together again, you've been dreaming, I guess, for before you go two hundred feet you are in the dirtiest part of Périgueux, picking your way very carefully over cobble-stones, dirty puddles, filth of all kinds, — almost swearing, — and wondering how you could ever have worked yourself into such a state of imagination as to conceive of a love-scene in such a place as this. But picturesque it is on all sides, and very likely if the wheels of time could turn back at our will they would reveal just such romances of real life. But meanwhile we have been winding out of this labyrinth of alleys, and are down near the river-bank. When half-way across the bridge the old bells of St. Front peal forth. Look quickly around and you will get what struck us as being the best and most impressive view of the old cathedral: rising out of the mass of tiled roofs, which are counted by hundreds, of all kinds, shapes, and states of preservation, the old church looks majestic and grand, and shows off to good effect the peculiar Byzantine character of the stone dome-work. Five cupolas, capped each with a stone turret, each cupola flanked by low gables, and each gable flanked by two turrets; from the west end springs a huge square tower made up of three stories, very dignified in design, and capped by a circular turret similar to those on the domes. . . . such in general is the impression at a distance. The large sketch of the turrets shows their construction, and the interest is increased when we know that all the columns of which they are composed are remnants of Roman buildings, and





VIEW OF ST FRONT FROM BRIDGE

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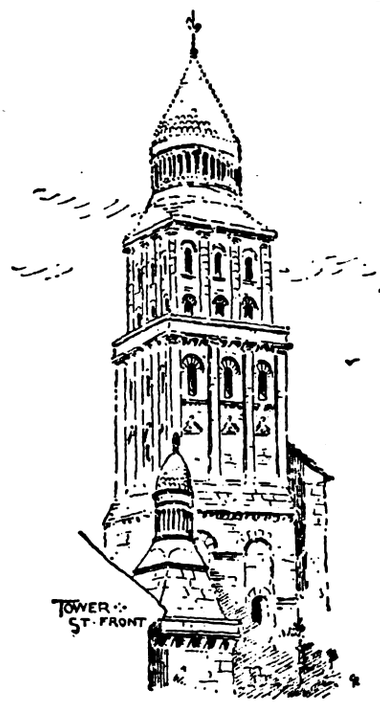
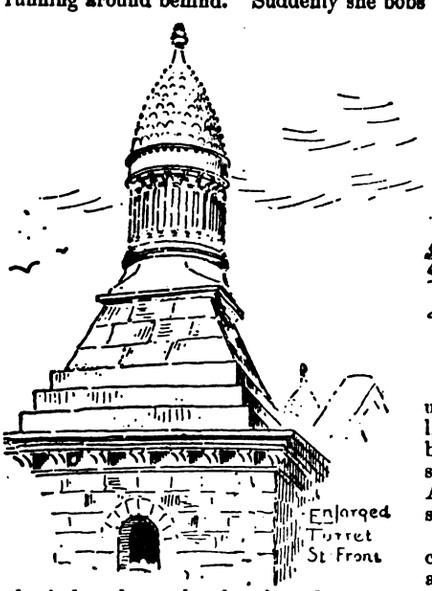
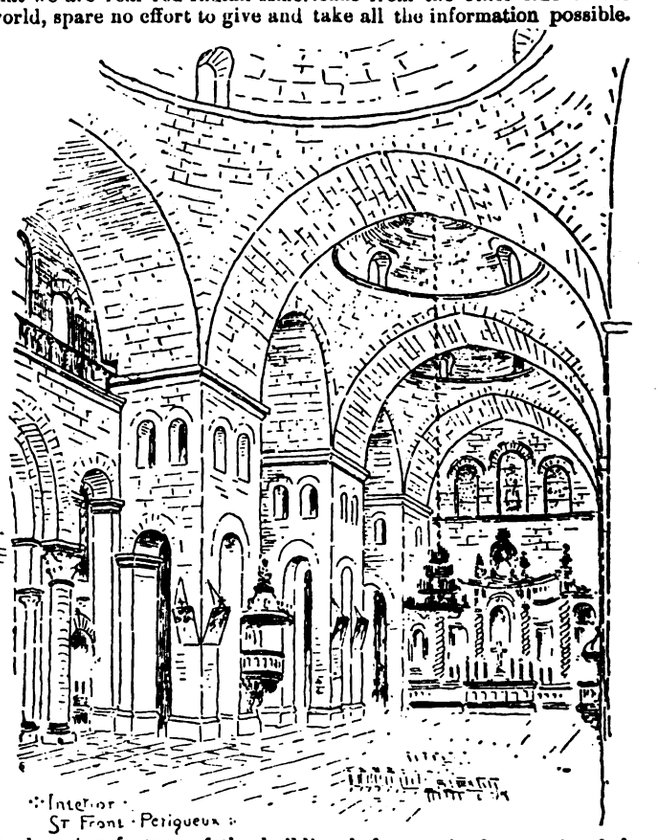
are part of the original structure. But pass along now, we will enter the church when we return. Crowds of peasants pass us, each leading some kind of animal, or dragging along a cart filled with vegetables or wares of some kind. If you follow them you will see that they go up to the public square, and after opening and arranging their display, wend their way to the church where they engage in devotion. This completed, they hurry back and commence the business of the day's trade. Sunday has thus quickly passed, and to all intents and purposes the day becomes the same as the week-day: in fact, with them there are seven working-days in every week. The clatter of *sabots* and the hoarse cries of the peasants have enlivened the way meanwhile, and we have crossed the bridge, gone a short distance and are returning upon another bridge, which brings us almost directly to the door of the cathedral: so we enter. Here comes an antiquated specimen of humanity, and evidently an old settler, well bundled up as if it were freezing weather. Suppose we stop and question him a moment. . . . . on the other hand he stops us and desires the loan of a sou. He is an old resident, takes quite an interest in the antiquity of the town, and can remember when St. Front had on its old garb of dull natural antiquity, and like a true antiquarian bemoans the restorers' efforts, which have given its whole interior a new surface, and obliterated every vestige of age. We mentally pat the old man on the back, inform him that "his head is yet level," while we slip a half-franc into his withered palm. While examining the certain huge grandeur of the interior, the construction of its arches and domes, a jaunty young peasant-girl clatters by with the curious little head-dress that is much worn throughout the centre of France. Down she kneels upon a chair, but is n't thinking a bit about her prayers or her beads, for she bobs around and is anxious to be off. If I don't hurry I shall lose my sketch. A saucy little pug-nose occupies the centre of the picture, and above are two just as saucy black eyes; the head is covered with a little puffed white cap with a ruffled rim, and set above this and at an angle of 45° exactly is a little black felt hat about four inches in diameter and held on by a ribbon running around behind. Suddenly she bobs up and is off in a twinkling, but not so quickly but I have secured her sketch to take back to America, a fact of which she little dreams.

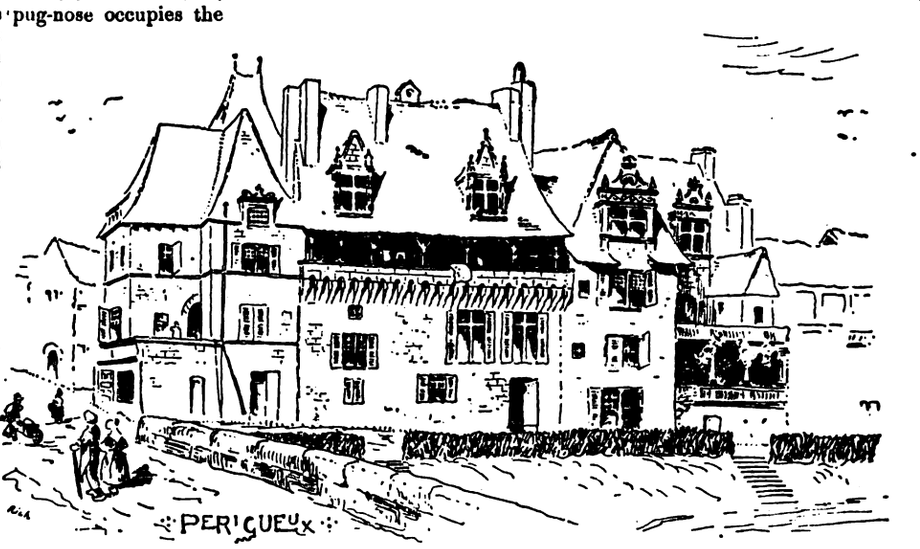




Finding it unsafe to carry on our devotions any longer in this frame of mind we leave the church and retrace our steps over the bridge, in order to sketch a charming old château which had caught our eye many times. It was certainly worth a better sketch had there been time. A priest and half-a-dozen boys, however, take up the time that should have been occupied in sketching, and who, upon finding that we are real red-Indian Americans from the other side of the world, spare no effort to give and take all the information possible.



A charming feature of the building before us is the massive balcony hung out on huge brackets of simple but effective design, and looking strong enough to hold up for ever and ever. Whether the roof which runs over this balcony is a part of the original structure it is impossible to tell, but at present the balcony is covered with a picturesque (?) assortment of mattresses, dirty cream-colored sheets and quilts, while above on lines hang towels, handkerchiefs, and a host of unmentionables in every conceivable shape and condition. Overhead four gables pierce the roof, those on the main building being of beautiful design and proportion, with stone-mullioned windows, and a heavy carved frieze, hardly defaced at all. To the right of the château is the little annex with the columns on the balcony where we talked and laughed with the Frenchmen and drank our bottle of wine on Saturday eve. A good place to stop, is n't it? Very well, we will sit down in the calm of the evening, and again await the sounds of the bugle, which shall send us to our hotel and to bed for the night.



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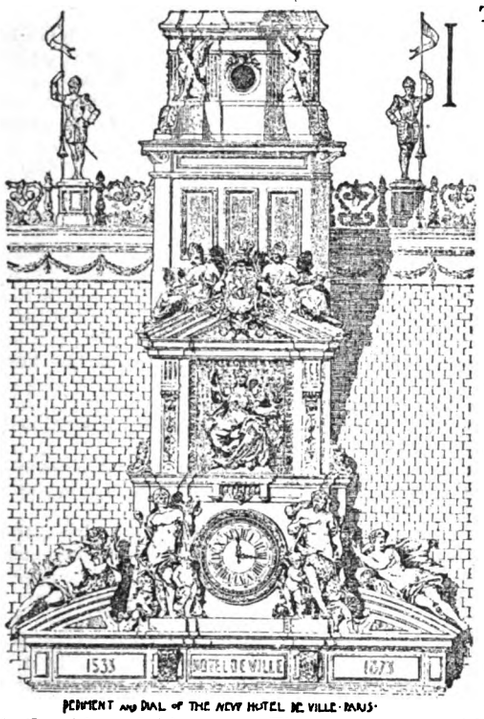
GIRDERS.[1] — I.



PEDIMENT AND DIAL OF THE NEW HOTEL DE VILLE PARIS.

IT is the belief of the writer that a full treatment of Girders will be of value to the profession, and will also supply a want which is frequently felt in practice, since this subject is generally treated in a fragmentary manner in the text-books, and it is often difficult to find and properly apply these detached formulæ to a special case.

To collect these formulæ and methods, show their relation to each other, and to put them in convenient form for the use of the architect or draughtsman, using the simplest possible methods, is the object of this essay. Those conversant with the subject will readily see what may be new and original in the method of treatment here employed.

The demonstrations of elementary formulæ and graphical methods will not be given, but reference made to the text-books, where they may be found.

The girders are supposed to be supported at each end, since this is almost invariably the case in practice, with the loading arranged upon them in different ways.

The general problem is naturally divisible into three parts.

1. Having given the length of the girder, and the amount and mode of arrangement of the loading, to determine the strains caused by this loading at any point of the length of the girder.

These strains consist of the following:—

a. The bending moment, which tends to produce flexure and eventually transverse breaking of the girder.

b. The shearing strain which tends to produce transverse shearing of the girder.

2. Having obtained the strains acting at any point of the girder and knowing the material of which it is to be composed:

a. To determine the stiffness of the girder required to safely resist the bending moment acting at that point.

b. To determine the additional area which must be added to the cross-section of the girder, to safely resist the shearing strain acting at that point.

3. Having obtained the stiffness required for the girder at any point, also the additional area for resisting shearing, and the form of cross-section of the girder being given, to design the section required at that point, and at as many other points in the length of the girder as may be necessary.

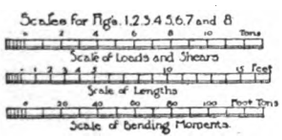
With the latter portion of the subject will necessarily be connected the consideration of the different forms of section, which are usually employed for wooden, cast-iron, wrought-iron, and compound girders, and also the usual methods of fastening together the different parts of the girder and of connecting the floor joists and beams with it.

I. TO OBTAIN STRAINS ON GIRDER: GIVEN, ARRANGEMENT OF LOADING AND LENGTH OF GIRDER.

The loads are here taken in net tons of 2,000 lbs. each; the lengths are in feet: consequently the bending moments will be in foot-tons, and the shearing strains in tons. This will materially lessen the number of figures required in the calculations and will also be found to simplify the formulæ.

The following examples will be found to comprise all possible modes of arrangement of the loading.

In all the examples, the length of the girder is assumed to be 28 feet in the clear between the supports.



Case I. *Load concentrated at centre of girder* (Fig. 1). A load of 8 tons is located midway between *A* and *B*.

Draw a horizontal line *A*–*B* to represent the girder, making it 28′ in length to any convenient scale, and also verticals through *A*, *B*, and the location of the load at *C*.

Commencing at 1, anywhere on the vertical through *A*, make 1–2 equal to 8 tons, at any convenient scale. Select any point 0, at the right of this line, and join 0–1, 0–2.

The line 1–2 is called the "load line," the point 0 the "pole," and the lines 0–1, 0–2 are termed "strings."

Commencing at any point *a*, also on the vertical through *A*, draw *a*–*b* parallel to 0–1, intersecting the vertical through the point of action of the load at *b*; *b*–*c* parallel to 0–2, and intersecting the vertical through *B* at *c*; join *a*–*c*, and draw parallel to it through 0, the line 0–*x*, cutting 1–2 at *x*.

The broken line *a*–*b*–*c* is called the "equilibrium polygon," the line *a*–*c* the "closing line," the line 0–*x* the "dividing line," and *x* the "dividing point," because the load line 1–2 is there divided into the two segments 1–*x* and *x*–2; 1–*x* always equals that part of the loading supported at the end *A*, and *x*–2 that at *B*.

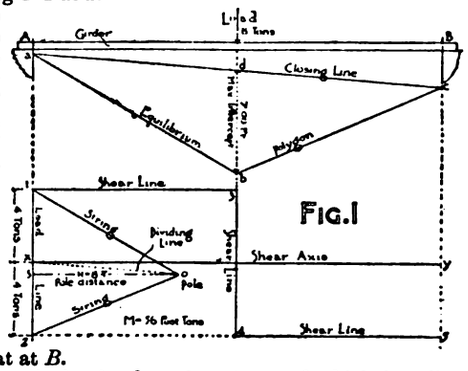


FIG. 1

Let fall the perpendicular 0–*s* from 0 on 1–2, and which is called the "pole distance."

Through 1 draw a horizontal line 1–3 to intersect the vertical through the load at 3; through the point *x*, the horizontal *x*–*y*, which is termed the "shear axis;" also through 2, the horizontal 2–4–5, intersecting the load vertical at 4, and that through *B* at 5.

The broken line 1–3–4–5 is termed the "shear line."

For determining the strains at any point of the girder, caused by the loading, we have the four following general principles, which are applicable to all modes of arrangement of the loading:—

1. The part of the loading above the dividing point equals that part of the load supported at the left-hand end of girder, or the reaction at that support: similarly, that portion below the dividing point equals the reaction at the right-hand support. (Ott's Graphic Statics, p. 11. Clarke's Graphic Statics, p. 22.)

2. The bending moment acting at any point of the girder will equal that portion of a vertical drawn through that point and intercepted between the equilibrium polygon and its closing line, and which may be termed the "intercept," multiplied by the pole distance 0–*s*. (Ott, p. 12; Clarke, p. 54; Dubois's Graphical Statics, 33.)

(N. B. — The intercept must be measured in feet at the same scale as that used for laying off the length of the girder, and the pole distance in tons, at the same scale as the lead line. Their product will therefore be a moment and will be in foot-tons.)

3. The shearing strain at any point will equal that part of the vertical drawn through the point and intercepted between the shear line and shear axis, measured in tons, at the same scale as the load line. This may be called the "ordinate," to distinguish it from the "intercept." (Ott, p. 11; Clarke, pp. 51, 53.)

4. The maximum value of the intercept, and consequently of the bending moment and the zero value of the shearing strain will always be found together at the same point of the girder; also the maximum shear and zero bending moment will always be found together and at one end of the girder.

Since the load is at the centre in the present case it is evident:—

1. That the two reactions at the supports are equal, and are each equal to 4 tons, which will be the maximum shear.

2. That since the product of the intercept and pole distance equals the required bending moment, and the pole distance is a constant, the bending moments at the different points will vary directly as the values of the corresponding intercepts. Consequently the maximum bending moment will be found at the maximum intercept, which is here at the centre of the girder and under the load.

The intercept measures just 7′ and the pole distance is here 8 tons, hence the maximum bending moment = 7 x 8 = 56 foot-tons.

When the girder is made of uniform cross-section from end to end, as is usually the case, except for cast-iron girders, only the maximum bending moment will be required, though the bending moments may be found at any number of points, by merely multiplying the corresponding intercepts by the pole distance.

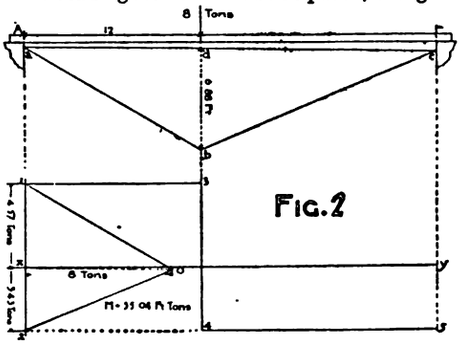


FIG. 2

The shearing strain equals 4 tons and is uniform from each end of the girder to its centre. (N. B. — It makes no difference whether this shear is measured upwards or downwards from the shear axis, since only its numerical value is required.)

[1] By Professor N. Clifford Ricker.

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Case II. *Load concentrated at any other point* (Fig. 2). A load of 8 tons is placed at a point 12′ from the left end.

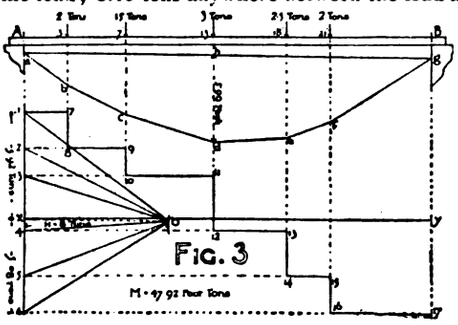
Lay off the load line 1–2, select a pole 0, draw the strings, the equilibrium polygon *a–b–c*, and the closing and dividing lines *a–c* and 0–*x*, as in the last case; also draw the shear line 1–3–4–5 and the shear axis *x–y*.

The following results are obtained: —

1. The vertical reaction at left support $= 1\text{–}x = 4.57$ tons; at right support $= x\text{–}2 = 3.43$ tons, the two being unequal in this case.

2. The maximum intercept is found under the load and measures 6.88′. As the pole distance here = 8 tons, the maximum bending moment $= 6.88 \times 8 = 55.04$ foot-tons, which is nearly 1 foot-ton less than was caused by the same load in the last case. It is therefore evident that the bending moment will be greatest if the load be concentrated at the centre of the girder, the amount of the load being the same in both cases.

3. The shear is 4.57 tons at any point between the left end and the load; 3.43 tons anywhere between the load and right end.



Case III. *Loads concentrated at different points.* (Fig. 3.)

At 3′ from left end is placed a load of 2 tons; at 7′, 1.5 tons; at 13′, 3 tons; at 18′, 2.5 tons; and at 21′, 2 tons.

Commencing as before, on the vertical through *A*, at any point 1, lay off downwards the loads in regular order from left to right along the girder, making 1–2, 2 tons; 2–3, 1.5 ton; 3–4, 3 tons; 4–5, 2.5 tons; and 5–6, 2 tons. Select any pole 0 and draw the strings 0–1, 0–2, 0–3, 0–4, 0–5, and 0–6, to the ends of each load.

Then, commencing at any point *a* on the vertical through *A*, draw *a–b* parallel to 0–1, intersecting the first load vertical at *b*; *b–c* parallel to 0–2, etc. Complete in this manner the equilibrium polygon *a–b–c–d–e–f–g*; draw closing and dividing lines *a–g* and 0–*x*, and the shear axis *x–y*.

Produce the load verticals and draw horizontals through the ends of the loads, thus obtaining the shear line, which will here be the broken line 1–7–8–9–10–11–12–13–14–15–16–17.

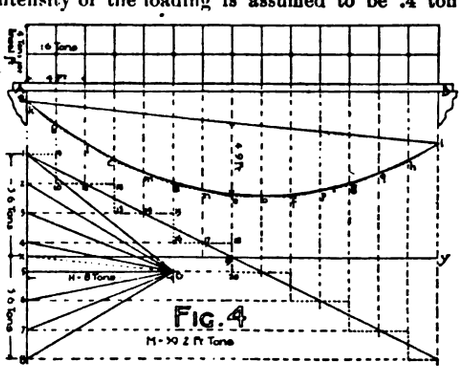
1. The reaction at left end = 5.92 tons; at right end = 5.08 tons.

2. The maximum intercept falls under the load at *d* and measures 5.99′. As the pole distance here = 8 tons, the maximum bending moment $= 5.99 \times 8 = 47.92$ foot-tons.

3. The maximum shear will be found between the left support and the nearest load and = 5.92 tons; between the first and second loads the shear is reduced to 3.92 tons; between the next pair to 2.42 tons, etc.

Case IV. *Load uniformly distributed along the girder.* (Fig. 4.)

In this case the intensity of the loading is assumed to be .4 ton per lineal foot of girder. The load may therefore be represented by a rectangle, of which the altitude represents the intensity of the load per lineal foot, to any convenient scale.



The total load on the girder $= .4 \times 28 = 11.2$ tons.

As this loading really consists of an infinite number of concentrated loads, infinitely near each other, the method previously employed cannot be directly used without some modification, which will not affect the accuracy of the results.

1. Let the rectangle which represents the loading be divided by vertical lines into sections of equal or unequal length.

2. The weight of each section is represented by its area and may be readily found by calculation.

3. Assume that the weight of each section is concentrated at its centre of gravity, acting like a load concentrated at that point.

The preceding method may then be applied and the equilibrium polygon and shear line obtained.

(An error is evidently introduced by the assumption of the manner in which the load acts, but it will be seen that this error is finally eliminated and the true result obtained.)

The loading is here divided into seven equal sections of 1.6 ton each.

Lay off load line = 11.2 tons, and divide into seven equal parts.

Choose a pole 0, draw strings, equilibrium polygon, shear line and axis, as in the preceding cases.

Produce the verticals, which separate the sections into which the loading is divided, to intersect the sides of the equilibrium polygon at *k*, *l*, *m*, etc.; also to intersect the shear line at 11, 12, etc.

1. Trace a curve tangent to the equilibrium polygon, at its ends and at the points of intersection *k*, *l*, *m*, *n*, *o*, *p* and *h*. This curve is termed the "equilibrium curve," since it is the true form of equilibrium polygon which corresponds to the actual distribution of the loading, and the required correct values of the intercepts are measured between the curve and the closing line. It is evident that as the length of the load sections is diminished, the equilibrium polygon approaches the curve, which will be its limit, when the sections are made infinitely short. The equilibrium polygon is here only employed as a convenient means of obtaining the curve.

2. Join by right lines the points 1, 11, 12, etc., where the shear line is intersected by the end verticals of the load sections. These evidently form a continuous straight line 1–9–10, which will be the true shear line, since the shear must equal half the loading at each end, diminishing uniformly to zero at the centre of the girder. This true shear line differs materially from the broken line first obtained.

The following results are obtained in this case: —

1. The reaction and maximum shear is the same at each end and = 5.6 tons.

2. The maximum intercept is found at the centre and measures 4.9′; as the pole distance here = 8 tons, the maximum bending moment $M = 4.9 \times 8 = 30.2$ foot-tons.

(When the loading is uniformly distributed along the girder the equilibrium curve will be a parabola, whose middle or maximum intercept will be one-half the vertical from the closing line to the intersection of the first and last sides of the equilibrium polygon, or the tangents at the ends of the equilibrium curve. Hence the maximum bending moment *M* will be just one-half that caused by the same load if it were concentrated at the centre of the girder.)

(N. B. — For concentrated and uniform loads, the values of the maximum bending moment and shear can be found by calculation, without the necessity of drawing the equilibrium polygon or curve.)

Let W = total load on the girder in net tons.

Let L = length of girder in the clear, in feet.

1. Load concentrated at centre of girder.
   Maximum bending moment $M = \frac{1}{4} WL$.
   Maximum shearing strain $= \frac{1}{2} W$.
2. Load uniformly distributed.
   Maximum bending moment $M = \frac{1}{8} WL$.
   Maximum shearing strain $= \frac{1}{2} W$.

LEGAL NOTES AND CASES.

Contract for Roof-Cresting. — Architect's Plans.

THE Supreme Court of Texas, in June, in the case of *Harry vs. Radkey*, was asked to decide that a mechanic who had contracted to furnish the materials for, and put the roof on a building, was bound to place thereon the cresting, it having been shown that the plans of the architect had the cresting. The plaintiffs sued for a balance of $400, they having received $3,200 of the sum they were to get, $3,600 for furnishing all the tin, galvanized iron and slating, and all the labor and material necessary to be used and placed upon the building, to be constructed according to the plans and specifications of F. E. Ruffini, architect and superintendent thereof. The plaintiffs claimed to have furnished the material and done the labor required by the contract, and alleged that the work had been inspected and received by the architect. The defence was made that the money demanded was not due the plaintiffs, as they had not put on the cresting, which, it was claimed, was a part of the work contracted for; the cost of the cresting was $400, the money retained therefor.

Judge Hart, in deciding in favor of the plaintiffs, said: —

The contract required the plaintiffs to do all the tin, galvanized-iron and slate work on the roof of the building, according to the plans and specifications of F. E. Ruffini, the architect. The evidence showed that the cresting was an ornament intended to be fitted on the tower of the building, and was to be made of pressed zinc or cast-iron, not galvanized iron, tin or slate, and the pressed zinc and cast-iron are both distinct metals from either tin or galvanized iron. It was also proven that the specifications did not show the cresting: that it was shown on the plans, and the architect testified that if he had drawn full and minute specifications of all the work required on the roof of the building, he would have put the specifications for cresting under the head of galvanized-iron work. This was the substance of all the testimony on the disputed point. The court below held that the cresting was neither tin, slate nor galvanized-iron work; that it was nevertheless covered by the contract, and that it was the duty of Harry Bros. to have placed it on the building. In this the court erred. The contract between the two parties was specific and unambiguous; it required of the plaintiffs that they should do the tin, galvanized-iron and slate work according to the plans and specifications of the architect. This much they were required to do, and this much they did. The plans and specifications of the architect were part of the contract, in so far as concerned the tin, the galvanized-iron and slate work, but no further.

This work Harry Bros. obligated themselves to do "according to the plans and specifications;" but the contract cannot be extended, by construction, so as to require of appellants any other duty than that specified in the contract. To hold that they should have put

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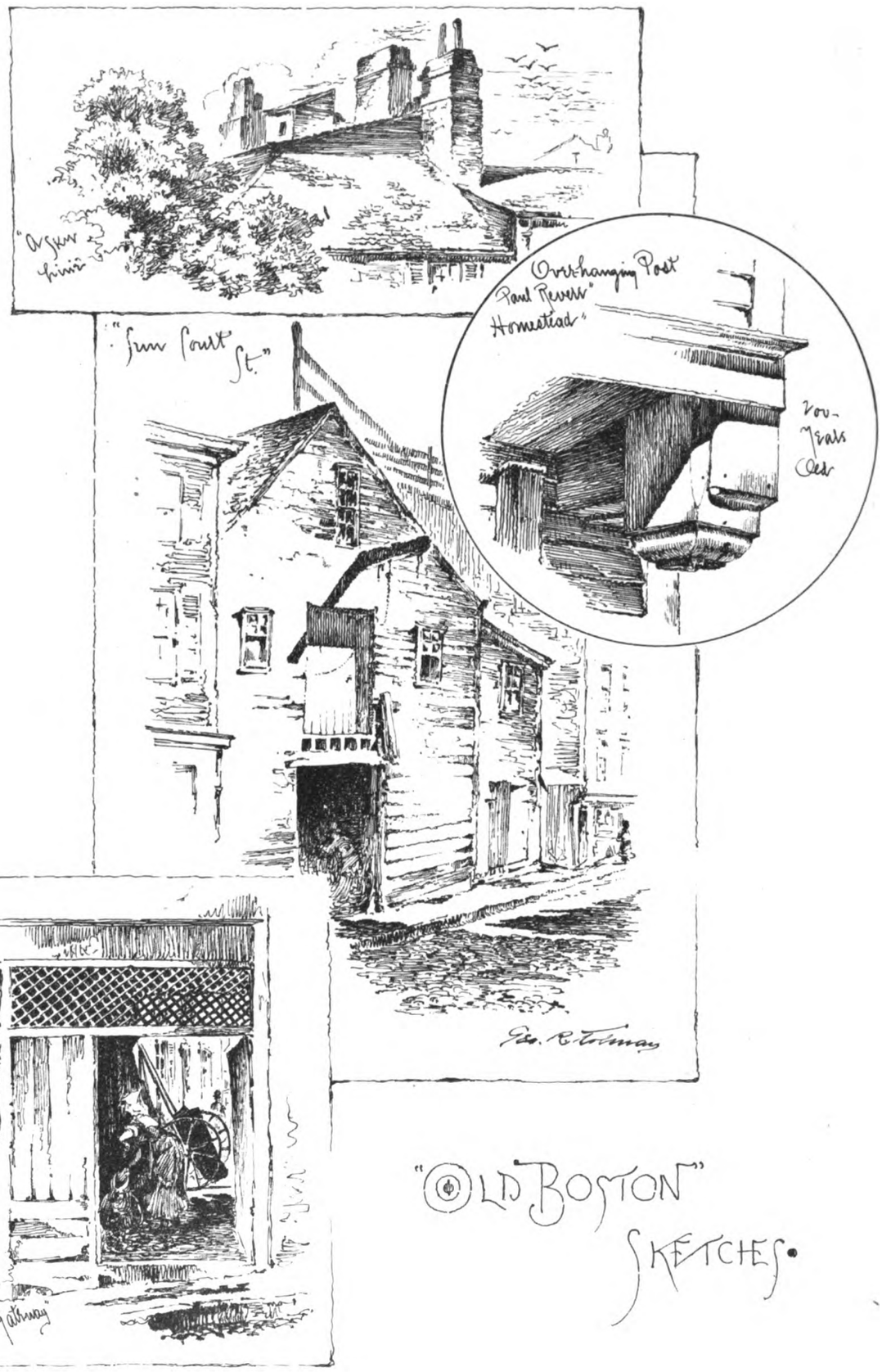

"OLD BOSTON" SKETCHES.

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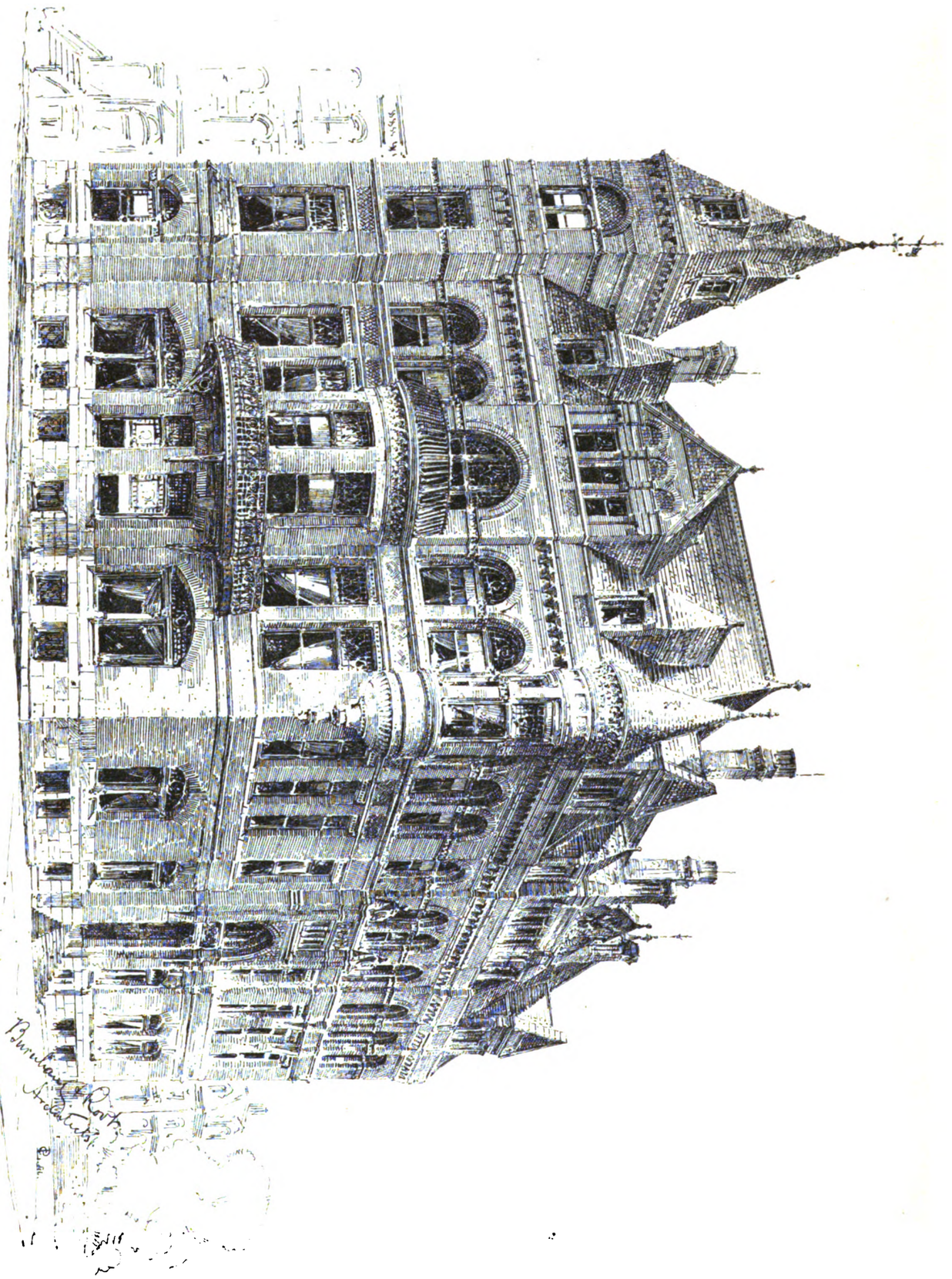
CALUMET CLUB. CHICAGO.



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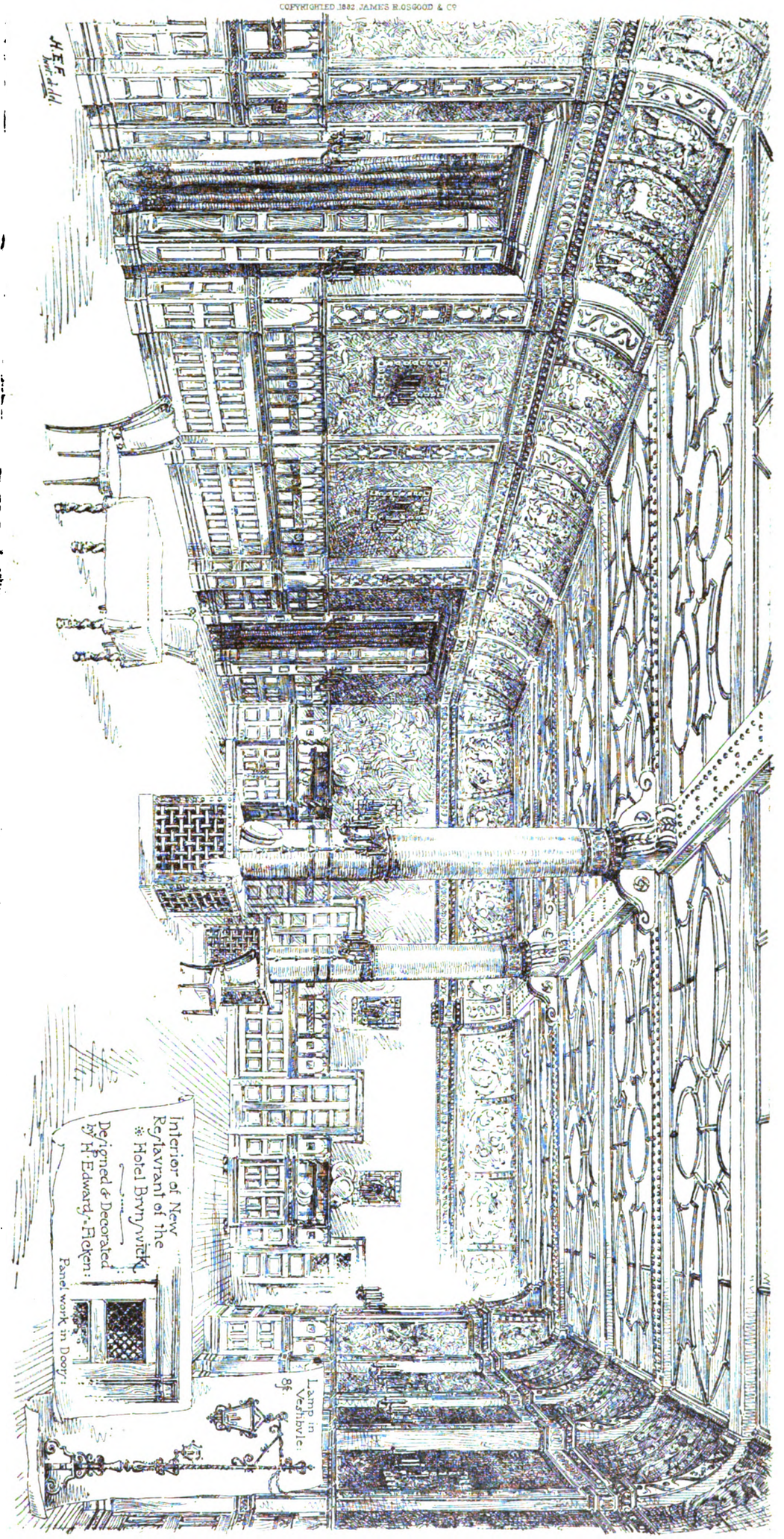
Interior of New Restaurant of the Hotel Brunswick
Designed & Decorated by H. Edwards & Hoken:
Panel work in Doors
85. Lamp in Vestibule.

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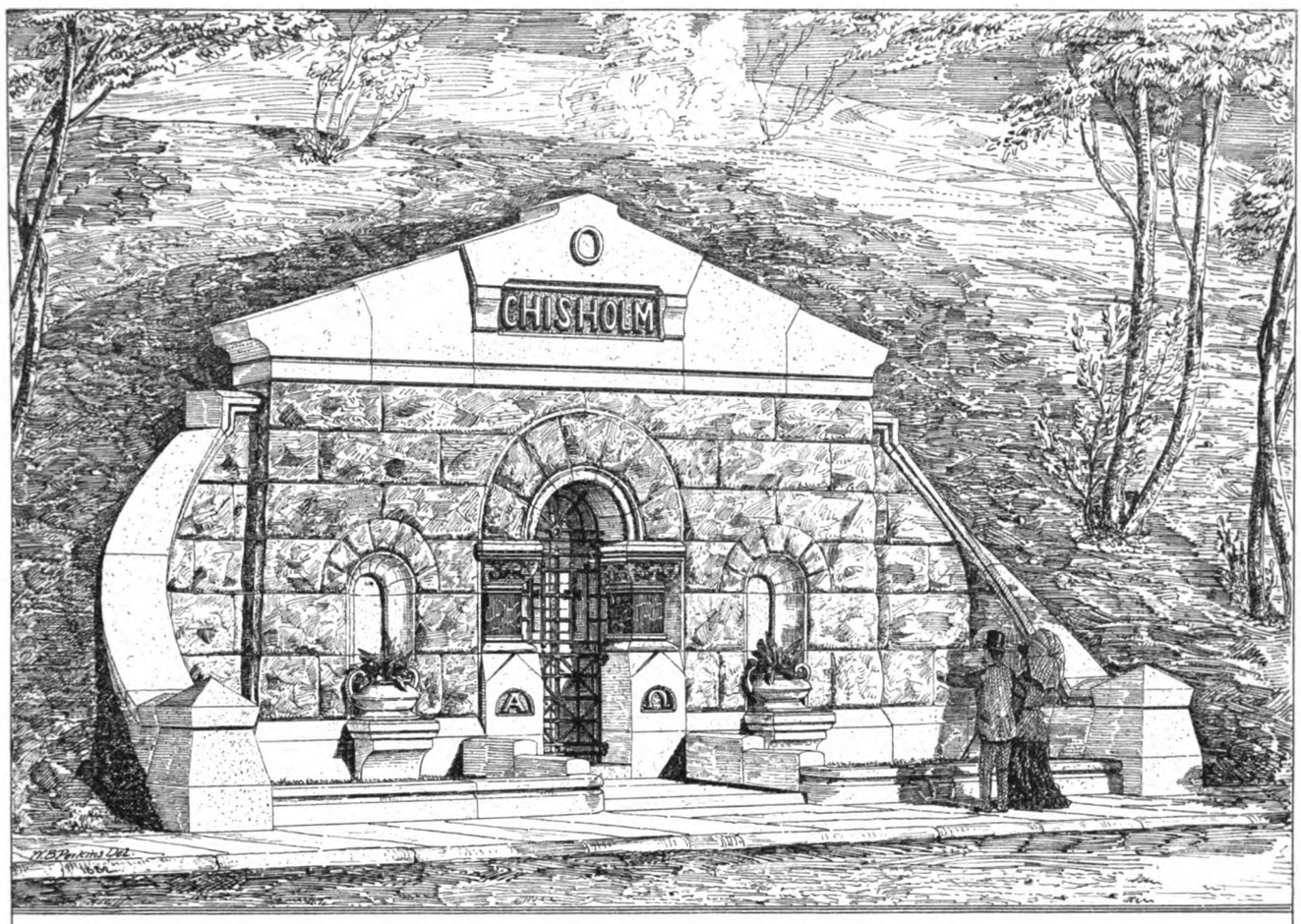

Tomb at Cleveland Ohio

W.W. Lewis Archt Boston Mass

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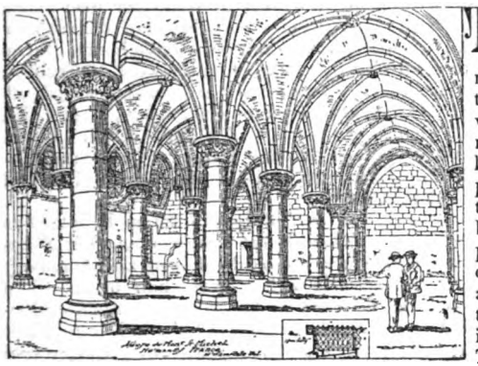
on the "cresting," which was to be constructed of a different metal, merely because it appeared in the plans, or because the specifications for erecting would have properly come under the head of galvanized-iron work, would be to make for the parties a contract they had not made for themselves. H. E.

ARCHITECTS' SPECIFICATIONS.



THE practical qualifications of an architect may be gauged by the specification he writes. We do not mean a crude list of works to be performed and materials supplied, but a properly prepared description of what is wanted, and plain directions how the work is to be done. There are set, or skeleton, specifications, those written after a kind of form, the only thing required being to fill up the blanks by inserting the materials and special requirements. A large number of specifications are of this kind; but there is always something about such documents which reveals their weakness, and which induces builders not only to neglect them, but disrespect them. Such specifications are generally taken by the contractor and thrown aside on his desk as worthless whenever a bill of quantities has been supplied. It is worth noting that since the introduction of quantity-taking the specification holds a less dignified and important place in the architect's and builder's estimation. It has become less essential as a guide to the builder, and as the items and descriptions in the quantities are practically the same as those of the specifications, the latter is disregarded. We do not see the carefully-prepared and detailed specification now that we used to twenty years ago, the reason being that the art and practice of the quantity surveyor has rendered the more venerable document less necessary. As our readers know, the surveyor now not unfrequently prepares the specification himself as well as the quantities for important works, and the former is made to agree with the latter, instead of, as formerly, becoming the leading authority. It cannot be a matter of surprise, therefore, that the specification has so fallen from its original estate as to be held in less repute. It is of some interest to inquire whether the loss of supremacy, or, rather, the substitution of bills of quantities for specifications, has been beneficial or otherwise. Before the era of contracting had commenced, and when builders' work was measured and valued, an architect took a pride in writing a clear and comprehensive specification of work. The builder had no object in trimming or evading it, as everything done was measured and paid for. Now, of course, evasion is the policy—we will not say of the scrupulous contractor, but of the greater number of that class. Again, the specification was a carefully-prepared description of the work to be executed: it is now looked upon as a trade bill. The items were only described: now they have to be priced. In this manner the builder is ready to charge for any details which are omitted: formerly only the intent and spirit of the clauses were accepted.

Recent decisions have, however, maintained the right and original principle: that a specification is not necessarily a perfect list of what is required in a contract to finish and complete a building. Details which are implied, or which are clearly known to be necessary for carrying out the work, though not described in the specification, cannot be charged for, as every builder who contracts impliedly undertakes to furnish everything necessary for completion. In a case tried some time ago (Armstrong *vs.* Jones) the plaintiff sought to recover damages for neglect in preparing the specification. The quality of the work executed was admitted to be not up to the specification standard, and it was contended by the defendant that no architect bound himself to a specification. Sundry alterations were made by the plaintiff himself. Evidence given proved that the work was not executed with sufficient care, and damages were given. In another case, there were specified certain joists, but no mention was made of the flooring, and it was held that the builder could not recover for the flooring as an extra, because it was included in the contract. At the foot of the specification the builder signed a memorandum agreeing "to do all the works of every kind mentioned and contained in the foregoing particulars, according in every respect to the drawings furnished"—the house to be finished and fit for occupation by a certain time. The specification also stated that the whole of the materials mentioned or otherwise in the foregoing particulars necessary for the completion of the work was to be provided. On another occasion a contractor claimed compensation on the ground that the defendants had warranted the work could be built according to specification and plan; the engineer stated in the contract that the plans and specification were "believed to be correct," and it was held there was no express warranty. If a certain specified performance is impossible a contractor is still liable for not being able to perform it.

From all these cases it is seen that an architect or engineer is not held to his specification as containing the whole amount of the contract work, though it is well to be on the safe side and to insert protecting clauses in the contract by which the builder agrees to be accountable for the full performance of the contract, and admits that the drawings and specifications are sufficient for their intended purpose, and that the work is to be done in all respects according to the intent and meaning of the specification, allowing a liberal construction. We here quote a very good precedent for the conditions of a specification. "The specification and drawings are to be construed according to their full intent, meaning, and spirit, when taken either separately or together. The drawings and specifications taken conjointly shall be deemed to explain each other, and be descriptive of the necessary works to be performed under the contract. But should there be any discrepancy or disagreement between the drawings and specification, or between the figuring on the drawing and the scale, or between the larger and smaller scale drawings, or between the descriptive writing on the drawings and the coloring, the wording of the specification shall take precedence in all cases; the figuring on the drawings shall be taken in preference to scale; the detail or larger drawings shall be followed in preference to the smaller scale drawings, and the descriptive writing in preference to the coloring. And should there be anything shown on the drawings, and not described in the specification as the converse thereof, the work shall be fully executed and carried out as if drawn, shown, or described in both." Much unpleasantness and angry recriminations would be saved between architect or clerk of works and builder, if such a clause as the foregoing were used in specification conditions. The composition of that document also would be more perfect, and written with more facility, if the preliminary of each trade and general directions were in every case introduced, and the abstracts of the bill of quantities referred to in every trade. These objects can only be properly attained by writing the specification by the aid of the quantities—a plan which, however much it may be deplored, has certain advantages which every architect will at once acknowledge. As long as surveyors continue to incorporate the clauses of the specification in their quantities, and to combine in one the two documents, the art of specification writing will deteriorate in quality.—*Building News.*

THE ILLUSTRATIONS.

RESTAURANT OF THE HOTEL BRUNSWICK, NEW YORK, N. Y. MR. H. EDWARDS FICKEN, ARCHITECT, NEW YORK, N. Y.

THE general tone of color in the room is light, without being obtrusive, and the different parts of the scheme are carried out in harmony, with none of the "swearing at each other" effect so often noticeable in decorations of large interiors. The architect has had the good fortune to be allowed full sway, and therefore by modifying the color in the carpets subordinated it to its proper relation. Its small old gold and yellow patterns upon a dark-blue ground are modest instead of glaring, and therefore pleasant and restful. The wainscoting is in ash, above which is a narrow dado in relief of panels continuing the color of the ash, but composed of a cement, and each containing a design for a tile. The body of the walls is covered with canvas, instead of the usual heavy stamped paper, and upon this are painted designs, the motive of which was taken from old tapestries. The background is of a bluish coloring, against which the delicate lines of the designs in old gold gleam with especial beauty in the gas-light. Above, the canvas is terminated by a raised moulding of a color to correspond with the wainscoting, and then comes the wide cove or arching frieze which gives the ceiling as a whole the appearance of barrel vaulting. This concave frieze, of gilded *papier maché*, spiritedly represents the scenes of a boar hunt. These are moulded in low relief: the moulding having been done by the architect himself, and the flying animals, hounds and hunters are repeated in the various panels forming the cove. The background of the ceiling is light, relieved by wavy water lines in old gold. It is panelled throughout. In the centre are two pillars with steam-radiators at their base. These have been colored of a light reddish hue, with circles of light gilding above to correspond with the colors generally employed, and at the top four corbels branch out from the shaft to support the girder above. This heavy iron girder, running longitudinally through the centre of the ceiling, has been left uncovered and turned to good account by being gilded. The bolt-heads thickly studding its surface show to especial advantage. There are five girders of wood and iron on each side of the central beam, running at right angles to it. All are colored of the same light yellow, hardly pronounced enough for gilding, and somewhat more lustrous than old gold. The office that these perform in breaking up the ceiling is carried out for the walls by projecting piers or broad pilasters, four or five of which are on each side. A wavy gilded scroll at the top of each relieves the stiffness of its vertical lines. The sconces on the walls with backgrounds of what seems embossed brass set in frames of blue glass tiles, the stained-glass windows very finely leaded and with coloring to blend with that in the interior, and the chairs, were from the architect's designs.

OFFICE-BLOCK, TOPEKA, KANS. MESSRS. HASKELL & WOOD, ARCHITECTS, TOPEKA, KANS.

This building, containing thirty-six offices, each with a fire-proof

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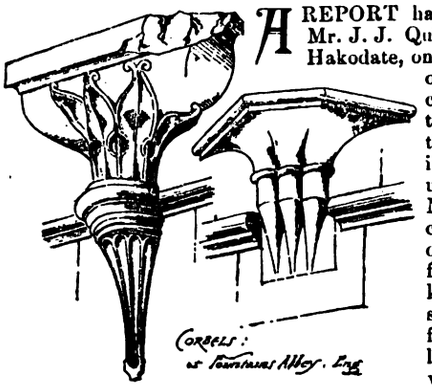
vault, is built of brick with cut-stone finish. It measures 65′ x 150′, and will cost $50,000.

TOMB OF THE CHISHOLM FAMILY, CLEVELAND, O. MR. W. W. LEWIS, ARCHITECT, BOSTON, MASS.

OLD BOSTON SKETCHES. BY MR. GEORGE R. TOLMAN, ARCHITECT, BOSTON, MASS.

THE CALUMET CLUB-HOUSE, CHICAGO, ILL. MESSRS. BURNHAM & ROOT, ARCHITECTS, CHICAGO, ILL.

JAPANESE GOLD LACQUER-WORK.



A REPORT has been prepared by Mr. J. J. Quin, Acting Consul at Hakodate, on the lacquer industry of Japan. It is intended chiefly as a description to accompany a collection of illustrative specimens, tools, and products at the Economic Museum at Kew. The cultivation of the lacquer tree and the manufacture of the various kinds of lacquer is described, the woods used for the production of lacquer ware, and the various processes of lacquering, from the ordinary plain work to the treatment of gold lacquer. In drawing up the report it was found that a number of Japanese terms had to be employed which necessitated a somewhat detailed explanation, so as to be intelligible to any one not acquainted with the language and not familiar with the technicalities of the trade. The *Architect* makes the following extracts on the gold lacquer work, describing the mode of treatment, which are of interest: —

Mode of making Gold Lacquer. — A description is given first of *Togi-dashi* (bringing out by polishing). The article, having been already subjected to twenty-two processes of ordinary lacquering, is then treated as follows: The picture to be transferred to the article is drawn on thin paper, to which a coating of size made of glue and alum has been applied — that known as *Mino-gami* is best. The reverse is rubbed smooth with a polished shell or pebble, and the outline very lightly traced in lacquer, previously roasted over live charcoal to prevent its drying, with a fine brush made of rat's hair. The paper is then laid, with the lacquer side downwards, on the article to be decorated, and is gently rubbed with a whalebone spatula wherever there is any tracing, and on removing the paper the impress may very faintly be perceived. To bring it out plainly it is rubbed over very lightly with a piece of cotton-wool, charged with powdered white whetstone or tin, which adheres to the lacquer. Japanese paper being peculiarly tough, upwards of twenty impressions can be taken off from one tracing, and when that is no longer possible, from the lacquer having become used up, it only requires a fresh tracing over the same paper to reproduce the design *ad infinitum*. This tracing does not dry, owing to the lacquer used for the purpose having been partially roasted, as previously mentioned, and can be wiped off at any time.

The next process is to trace out the veining of the leaves, or such lines to which in the finished picture it is desired to give the most prominence, and these lines are powdered over with gold-dust through a quill. The qualities called *Mijin*, *Koma-kame-mijin*, and *Aragoku* are generally used; either finer or coarser qualities cannot be used. The article is then set to dry for twenty-four hours in the damp press. The outline is now drawn carefully with a rat's-hair brush over the original tracing line with a mixture of black and branch lacquer, called *Rō-sé*. The whole is then filled in with *Rō-sé* applied with a hare's-hair grounding-brush. Gold-dust of a slightly coarser quality than *Mijin* is scattered over the lacquered portion, and the article is set to dry for twenty-four hours. Another thin coating of *Rō-sé* lacquer is again given to the gold-powdered portions, and the article set to dry for twelve hours. Next a coat of *Rō* (black lacquer) is applied over the whole surface of the article, which is set to dry for at least three days. It is then roughly ground down with magnolia charcoal, the surface dust being constantly wiped off with a damp cloth till the pattern begins to appear faintly. Another coating of *Rō* lacquer is then given and the article set to dry for thirty-six hours. It is again ground down with magnolia charcoal as before, this time till the pattern comes well out. The ensuing processes are the same as described in black lacquer.

In making *Togi-dashi* on hard woods, transparent lacquer is used instead of *Rō*.

Flat Gold Lacquer. — For this method, called *Hira-makiye*, the article having been thoroughly finished, either in black or red, etc., a tracing is applied to the surface as in *Togi-dashi*, the outline is carefully painted over with a fine brush of rat's hair, and then filled in with a hare's-hair brush, using *Shitamaki* lacquer (branch lacquer and red oxide of iron). Over this surface, gold-dust, of the quality called *Aragoku* being generally used, is scattered with a brush of horse's hair (*Kebo*) till the lacquer will not absorb any more. The article is then set to dry for twenty-four hours. A thin coating is next applied over the gold of transparent lacquer or *Yoshino* lacquer, and set to dry for twenty-four hours at least. It is then most carefully smoothed with camellia charcoal and finally polished off with *Tono-ko* and a little oil on the point of the finger, till the ornamented portion attains a fine polish. The veining of leaves and the painting of stamens, etc., of flowers, or such other fine work is now done with a fine rat's-hair brush charged with *Ke-uchi* lacquer, over which fine gold-dust (*Goku-mijin*) is scattered from a brush of horse's hair (*Kebo*) as before and the article set to dry for twelve hours. Some *Yoshino* lacquer is then applied to a piece of cotton-wool, and rubbed over the whole surface of the box or other article, and wiped off again with soft paper. It is set to dry for twelve hours, after which it is polished off with deer's-horn ashes and a trifle of oil. When very high-class work is desired *Yoshino* lacquer to which a little water has been added, is applied and polished off a second time, and a very brilliant surface is attained.

More ordinary "flat gold lacquer" differs in the manufacture as follows: the tracing is accomplished in the same manner, but *Shitamaki-nobe* lacquer (branch lacquer, red oxide of iron, and camphor) is used for filling in the pattern with a hare's-hair brush. The article is then set to dry in the press for ten to twenty minutes, during which time the lacquer has begun to harden and less gold will adhere. Then gold-dust (*Goku-mijin*) is applied with cotton-wool thinly, and the article is set to dry for twenty-four hours. The whole surface is then smeared over with *Yoshino-nobe* lacquer (*Yoshino* lacquer and camphor) on a piece of cotton-wool and wiped off again with soft paper. The reason is that it is less trouble to smear over the whole surface thinly, and it is, moreover, not necessary to give a thick coat of lacquer to the decorated part, as the gold-dust has been very thinly applied. It is set to dry for twelve hours, and ground smooth with camellia charcoal, and polished with powdered whetstone and oil on the point of the finger. The fine lines are then drawn with a rat's-hair brush charged with *Shitamaki* lacquer and sprinkled with gold-dust (*Goku-mijin*) from a brush (*Keto*), and the articles set to dry for twelve hours. The whole is again smeared with *Yoshino-nobe* lacquer and carefully wiped off again with paper, and set to dry for twelve hours. The article is then polished with powdered whetstone and oil on the point of the finger, and a second application of *Yoshino-nobe* lacquer with a little water, wiped off with soft paper, set to dry for twelve hours, and finally polished off with deer's-horn ashes and oil on the finger finishes the operation.

Should it be required to make any dark spots or lines such as bird's eyes, or to draw human hair, etc., or other shading, this is done last of all with *Kuma*, "bear" lacquer, and *Jō-hana* and lamp-black.

For a more common kind of flat gold lacquer painting, instead of tracing the design in roasted lacquer, it is done with a mixture of powdered *Tono-ko* (burnt clay from Mount Mari) and water, and the impression is transferred to the articles with the whalebone spatula as before. The reason for only using *Tono-ko* instead of lacquer is that the ground-work being inferior it cannot be ground or smoothed afterwards, and the edges of the pattern would not be clean nor stand out clear, should any lacquer get smeared outside the tracing line. The outline is then filled in with *Shitamaki-nobe* lacquer with a coarse hare's-hair brush and the article is set to dry for twenty minutes, or till a thin skin has formed on the lacquer, and then the half-dry surface is wiped over with cotton-wool charged with *Keshi-fun*, the finest gold powder, and set to dry for five or six hours. The whole surface is then smeared with *Yoshino-nobe* lacquer, which is carefully wiped off again with soft paper, and the article set to dry for half a day. The surface is then rubbed over gently with deer's-horn ashes and soft paper to give it a polish, and to get rid of any of the last coat of *Yoshino-nobe* lacquer.

The fine lines are now drawn with a fine hare's-hair brush charged with *Shitamaki-nobe* lacquer, and the articles set to dry for twenty minutes or so; then *Keshi-fun* is applied with cotton-wool and again set to dry for five or six hours. No further process takes place.

Raised Gold Lacquer. — In the method *Taka-makiye* the ground-work may be either black or colored lacquer, *Nashiji* (pear basis of gold-dust), or the plain wood. The outlines of the pattern are transferred to the surface of the article in the same manner as in *Togi-dashi* or "flat lacquer." The outline is then painted over with *Shitamaki* lacquer, and this is covered with powdered camellia charcoal. If the outside is to be higher than the inside a broad margin is painted and covered with the charcoal powder, leaving the centre untouched, and *vice versa;* if the centre is to be higher a faint line only is painted outside and the inside is given a thickish coating, which is sprinkled with the charcoal-dust and the article set to dry for twelve hours. When taken out of the press it is well dusted to get rid of any loose charcoal powder and is also washed, using a brush made of human hair (*Hake*) to clean out all crevices and bring out the lines, etc. Some *Yoshino-nobe* or "branch lacquer," with camphor, is now rubbed on with a piece of cotton-wool and carefully wiped off with soft paper, and the article set to dry for twelve hours. The raised parts are next carefully ground smooth with a piece of magnolia charcoal and a second coat of *Yoshino-nobe* or of "branch lacquer" is applied as before and dried.

[If a well-raised pattern is required, one, two, or even three coats of *Sabi* ("branch lacquer" and *Tono-ko*) are applied, the outside edges being painted with a brush of deer's hair (*Menso*), and the inside lacquer applied with a small *Sabi* spatula, the article being

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set to dry between each application for twelve hours. For coarser work it is then ground smooth with a white whetstone, and for finer work with a yellow whetstone. Over this some "branch lacquer," mixed with camphor, is rubbed with cotton-wool and wiped off with soft paper, and the article set to dry for twelve hours.]

If the pattern is not to be very high the operations described between the brackets are omitted. A coating of *Takamaki* lacquer is now given, the outside edges being carefully drawn with a rat's-hair brush, and the inside of the pattern filled in with a hare's-hair brush, and the article set to dry for thirty-six to forty-eight hours. When taken out of the press the surface is ground smooth with magnolia charcoal, and then partly polished with powdered camellia charcoal on a cotton cloth. A little oil is now rubbed on, and a further polishing takes place with powdered "whetstone" on a cloth. Next "branch lacquer" is rubbed over the raised parts with cotton-wool and wiped off with soft paper, and the article set to dry for twelve hours. It is next polished with deer's-horn ashes and a little "rape seed" or "sesamum" oil applied on the point of the finger. Up to this point the formation of the pattern, whether mountains, waves, trees, men, birds or animals, has been gradually completed.

If small squares of gold foil (known as *Kiri kane*), or of colored shell, are used in producing the pattern, they are now applied one by one on the point of a bamboo stick (*Hirame fude*), the spot where they are to be affixed having been smeared with a little *Rō-sé* lacquer to make them adhere. When all that is required has been affixed, a piece of soft bibulous paper is spread over the freshly-done parts and pressed very carefully with the finger. This is to get rid of as much as possible of the *Rō-sé* lacquer as is not covered by the gold squares; the article is set to dry for twelve hours, and then the portion where the gold has been applied is gently polished with a little camellia charcoal on the point of the finger, to get rid of the remainder of the *Rō-sé* lacquer. Shell patterns and the coarser kinds of gold-dust that may be required are applied in the same manner. The finer kinds of gold-dust are applied next, over a coat of *Shitamaki* lacquer, and the article set to dry for twelve hours. The remaining processes of polishing, drying, etc., are the same as in first-class "flat gold" lacquer.

For making raised lacquer patterns on plain wood the whole surface is covered with tin-foil, stuck on with rice paste, to keep the wood quite clean, and then the place only where the pattern is to come is cut out. In making all high-class lacquer the edges of every article are pasted over with tin-foil to prevent their being rubbed or injured by the workman, and the same is done over each portion as it is finished.

The above is the ordinary method of making best raised lacquer, but there are such innumerable modifications of one process or another, according to the object to be produced, that it is manifestly impossible to do more than give the above cursory sketch. Nearly every piece of good lacquer made exhibits a specimen of each kind, viz.: *Nashiji*, *Togi-dashi*, *Hira-makiye*, or *Taka-makiye*.

In making raised lacquer on inferior articles the methods do not vary much from the good kinds: the work is merely less carefully executed. The saving is in the quantity and quality of the gold-dust used, and the absence of minute after-work, or in the use of silver and tin instead of gold dust. In the very cheapest kinds burnt tin-dust is used instead of charcoal over the first coat of *Shitamaki*. This is burnished bright, and over it a thin coating of lacquer and gold-dust is applied. At first it looks well, but loses its color in a year or two. By using tin powder the same height is attained in one coat that would necessitate at least three coats of lacquer and charcoal-dust. This kind of work is, however, only used for cheap articles for foreign export, and has been quite lately introduced.

Lacquering on Metal. — For lacquering on iron or copper, brass or silver, the metal is smoothed and polished, and then given a coating of "crude lacquer" or "black lacquer;" the article is put over a charcoal fire, and the lacquer is burnt on to the metal till all the smoke ceases to escape. The fire must not be too fierce, and the metal must not be allowed to get red-hot, or the lacquer turns to ashes. After the lacquer has burnt quite hard the surface is rubbed smooth with *Largerstramia* charcoal: these operations are repeated three or four times, till a good foundation of lacquer has been obtained. Then the same operations exactly are repeated as in making best "black lacquer," *Togi-dashi*, "flat gold lacquer," or "raised gold lacquer," only that the lacquer is burnt dry over the fire instead of being dried in the press. The lacquer is thus rendered quite hard and very durable. After the first two or three coats have been burnt on, the subsequent drying processes can be carried on in the damp press, should it be so desired.

In winter, or when any article is required in a hurry, the workmen sometimes put a charcoal-fire in the press, over which a pan of hot water is placed. The steam which is thus generated helps to dry the lacquer in an hour or two, which would take twenty-four hours to harden ordinarily, but the lacquer thus dealt with loses its strength and is never very hard. "Black lacquer" turns a rusty brown, the coloring virtue of the iron being apparently lost, and therefore this plan is never adopted for good work, and in second-rate work only for under coats.

The style of ornamentation *Nashiji*, occupying an intermediate position between plain and ornamental lacquer, is therefore treated of last. Till the opening of Japan to foreign trade it was in the hands of workers in gold lacquer, but now for the most part all *Nashiji* on articles intended for exportation is applied by the workers in plain lacquer. In making best *Nashiji*, as in *Togi-dashi*, the first twenty-two processes are identical. A coating of *Rō-sé* is applied and the gold-dust is sprinkled over this surface through one or other of the bamboo tubes, according to the fineness required. The article is set to dry in the press for forty-eight hours, and is then given a thin coating of pure transparent varnish. This is set to dry for three or four days, when it is roughly ground with magnolia charcoal, and a second coat of transparent lacquer given. The article is set to dry for forty-eight hours, and then ground with magnolia charcoal till a perfectly smooth surface is obtained. Transparent lacquer is then applied with a piece of cotton-wool, and wiped off again with soft paper, and the article set to dry, for twenty-four hours. It is then polished with a mixture of *Tono-ko* and camellia charcoal powder and a little oil. Next a coating of *Yoshino* lacquer is given, and wiped off with paper; the article is set to dry for twelve hours, and then it is polished with deer's-horn ashes and oil. This is repeated three times to finish the article.

The same processes are gone through when using silver instead of gold dust. For cheap qualities tin-dust is used, and the powder is scattered on glue immediately above a coating of *Kanoji* (whiting and glue). When the article is dry it is burnished with *Tokusa* (*Equisetum*), and as soon as it presents a bright surface a coating of pure transparent lacquer with gamboge, is given to it. It is set to dry for a day in the press, and then ground with *Magnolia* charcoal. Over this a coating of *Shu-urushi* (transparent varnish containing oil) is applied, and another drying for twenty-four hours completes the process.

ONE-STORY HOSPITALS.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sir, — The average destruction by fire in the United States for several years past has been something over *one hotel per day: one church per week, and one hospital, almshouse or asylum per month.* For the last year or two the average has been somewhat higher, especially in respect to hotels and *hospitals.*

The Mutual underwriters have been lately consulted upon a subject somewhat foreign to their customary work, to wit: the right construction of hospitals and asylums with a view to safety from loss by fire; and it has occurred to us that a few very crude suggestions upon a subject entirely outside our usual work may have some value.

It may be considered conclusively proved that a factory building consisting of a basement sufficiently high to secure a free circulation of air, and of one story or main floor devoted wholly to machinery, lighted and ventilated mainly from above by monitors or lanterns, can be kept more uniformly warm in winter without the use of any excess of fuel; more uniformly cool in summer if the roof is constructed in the right manner, and can be furnished with a more adequate supply of pure air all the time, than any other description of building suited to factory use of two or more stories in height.

It may also be considered conclusively proved that when a given amount of floor-surface is required on a considerable scale, it can be provided in a thoroughly substantial way at as low a cost, per square foot of floor, of available floor-surface as can be provided in any other form of building of two to seven stories in height.

It has also been proved in practice in one very complete example, namely, the great one-story mill of the Willimantic Linen Company, that if what might be called a continuous flower-pot is constructed on the inside around the whole of the enclosed floor-space, forming, as it were, an offset from the wall, in which plants and flowers may be cultivated, that the humidity imparted to the atmosphere by the watering of the plants and by the aqueous vapors thrown off in their growth, makes the best atmosphere for spinning cotton, and also one admirably suited to the health of the operatives.

It has also been conclusively proved in certain basements of mills and in buildings having brick or stone floors, that the heat may be much better diffused, and the feet kept warmer, by hanging the steam-heating pipes overhead rather than by placing them low down at the sides of the rooms. This effect, however, has only been observed in rooms in which machinery is in operation; further observations would be required before it would be considered a matter fully proved in rooms in which there is no mechanism by which the circulation of air may be affected. [1]

Bearing in mind the preference expressed by surgeons and physicians for tent and cottage hospitals, it has occurred to me that a *one-story* hospital or asylum constructed upon the *one-story* factory plan and divided into wards either by solid partitions or by hangings or curtains which could be removed and washed, might be worth consideration.

The advantages might be as follows: —

1st. A solid three-inch plank floor covered either with one thickness of mortar and a top floor of hard wood, or else covered with concrete made of Val de Travers asphalt, either of which surfaces might be kept perfectly clean and sweet, would be impervious to dampness, either from below or from above; while the great thickness of non-conducting material would make such a floor very warm to the feet even if no artificial heat were distributed in the well ventilated basement underneath.

[1] In the proposed one-story hospital, the basement can be used for heating apparatus of any kind.

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2d. The thick roof of not less than three-inch plank covered upon the outside, first with roofing felt, and then with cotton duck painted with a light color, would reflect the heat of summer and retain the artificial warmth imparted to the air in winter in the best manner. The monitors or lanterns prove to give the very best possible means for promoting the circulation of air, which circulation may also be improved by special arrangements of the side windows such as are now adopted in weaving sheds.

3d. The walls may be constructed either of porous brick (advocated I believe by some practitioners), or of brick vitrified on the inner surface so as to be kept perfectly smooth and clean. It will be apparent that such a building, if divided into wards or apartments in a proper way, may be kept perfectly clear of concealed spaces, free from vermin, free from solidified hospital smells, and might in many respects be a building in which the attendance could be most easily conducted under the pleasantest supervision.

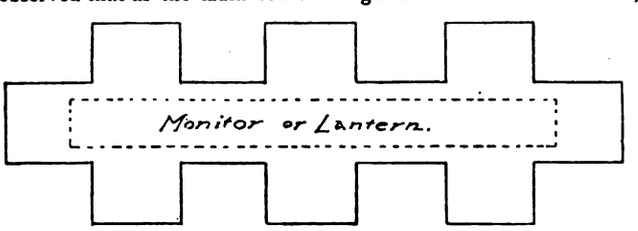
There might also be an advantage in the absence of any necessity for carrying patients up and down stairs. The level of the entrance can be adjusted to the level of the floor of the ambulance so as to render the carrying of the sick or wounded to the ward or bed as easy as possible.

It goes without saying that such a building is vastly safer from danger even if fire occurs, than a high building of any sort can be. It will also be apparent that divisions may be made almost at will, with a view to dark rooms, very warm rooms, etc. The main cost is in the shell and floors, and within whatever space is enclosed any distribution of apartments can be made in such a way that alterations can be had at any moment, almost without cost.

Perhaps these suggestions may have no practical value; but I think the points developed in the mill practice affecting the health of the operatives might well be observed by architects who must consider the health of the patients or other occupants of the buildings planned by them. I may add as a matter of detail that, given a level piece of ground and a good foundation, a one-story factory building of the most substantial kind can be constructed in the manner named in this communication, at a cost of about forty thousand dollars an acre of floor surface.

It would perhaps be worth while for architects who are called upon to plan college recitation-rooms, laboratories, reading-rooms and drawing departments, to consider this method of construction, when the means at their disposal are very limited. A good example of this work may be found at Jamaica Plain, in the one-story factory now being constructed by Mr. M. D. Ross, near the Jamaica Plain station, from plans made by Mr. W. H. Dabney, Jr., upon the method devised by our Mr. W. H. H. Whiting.

Mr. Whiting suggests that the plan of a one-story mill in the shape of a Greek cross, or in the following form would be best suited for a hospital, but the latter would cost more per foot of floor. It will be observed that as the main source of light and air is in the monitors,



annexes can be built on to the sides or ends of a one-story hospital in any way to serve special purposes. When such a plan as this is rightly carried out in the details, all the timbers and plank can be ordered of such lengths and sizes as to be interchangeable.

I hope that these suggestions may provoke some discussion and thereby develop the weak points in our method from the standpoint of the architect. As yet our structures have received but little attention except from the underwriter and the mill-owner. E. A.

BOOKS ON EGYPTIAN ARCHITECTURE.

Washington, D. C., September 15, 1882.

To the Editors of the American Architect: —

Dear Sirs, — Will you gentlemen be kind enough to inform me where I could obtain the book of the order of Egyptian architecture? Must be perfect and pure: no other will do but the best. Please let me hear as soon as possible, with price of same.

Yours, etc., J. Germuiller,
Care of F. W. Miller. 513 Seventh Street, n. w.

[Rosellini, "Monumenti dell' Egitto e della Nubia;" Mariette Bey, "Monuments of Upper Egypt;" Lepsius, "Denkmöler aus Ægypten und Æthiopien;" Dénon, "Description de l' Egypte." Inquire price, etc., of J. Sabin & Sons, Nassau Street, New York. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Lion of Lucerne. — Thorwaldsen's famous lion at Lucerne, which has till now been the property of the Swiss family of Pfyffer, is about to pass into the possession of the town of Lucerne. The citizens hope to preserve it more effectually than has hitherto been the case from those vicissitudes of the weather to which the monument is necessarily exposed.

Details of the Panama Earthquake. — The Panama *Star and Herald* of September 7 gives the following details of the earthquake there on the previous day: "That the shocks this morning were of exceptional violence appears to indicate a terrible calamity in some of those districts — and in all probability in the North — rather than a possibility that the old-time freedom of the Isthmus from earthquakes is about to disappear and that henceforth we are to be subject to such dangerous and fearful visitations as those which this morning threatened the city with ruin. The amount of damage done cannot as yet be estimated, but it must amount to at least $250,000. The Municipal Building and Assembly Rooms, under which the Cascada is situated, were much damaged. The whole of the massive balcony fell bodily into the square, dragging with it the roof and all adjacent timber. The Cathedral also suffered severely. Almost the whole of the ornate pediment, composed of heavy blocks of masonry, fell through the roof or on the steps leading to the principal entrance. Every arch in the nave is cracked and split, and large stones and pieces of cement have fallen from them. The side aisles are also seriously damaged, and an expenditure of at least $50,000 will be required to restore the building. The roof of the Assembly room will be repaired by the evening, Governor Borbua having acted with remarkable celerity and commenced work at once in order that the archives and furniture may not be exposed to damage from rain. Private houses damaged are innumerable, and owners as yet fail to form a correct idea of the losses they have incurred. The walls of the Canal Office are cracked in several places, and the edifice requires strengthening. No estimate of damage can be made, but an expenditure of several thousand dollars must be incurred to render the building as safe as it was before the shock. The ruins of buildings destroyed by fire are unfortunately too conspicuous in the centre of this city. Their danger has frequently been pointed out, and the earthquake has now accentuated the peril consequent on their being allowed to remain as at present. Masses of these ruins have fallen down, and gaping cracks prove that it will be necessary that some of them should be torn down. Outside the city a number of houses have suffered. One of the towers of Malambo Church has fallen, and a piece several yards square of the roof of Santa Ana Church has tumbled in."

The Shrine of Sidi Ab Dullah. — Here nearly twelve hundred years has slumbered a personal friend of the founder of the faith of Islam, who lived, died and was buried, wearing always as a symbol of devotion a portion of the Prophet's beard on his breast. The chamber is about 21′ square, and lofty. Its walls are covered with a geometrical pattern worked out in black and white marble. Four lengthy inscriptions are imbedded in them, and the room is dimly lighted by four small windows of rose-colored and blue glass. From the cupola of fret-work hangs a grand old chandelier of twisted Venetian glass. Below this is the tomb itself, surrounded by a high grating of bronze, shut in by four marble columns about 7′ high. From a rod on a line with the grating hang festoons of ostrich eggs and golden balls. The catafalque above the grave is covered by two elaborately-embroidered palls: the first, of black and white velvet adorned with Arabic inscriptions of silver, was the gift of the late Ahmed Bey; the second, of pink and blue brocade, was a votive offering from Muhamed of Sadek. Over these hung thirteen banners, rich in gold, silver and needlework, the tribute of the successors of Hussein Ben Ali to the sanctuary of the Sidi Bou Awib. Our visit was certainly unexpected, for at least a dozen fine Arabic manuscripts rested on as many lecterns of mother-of-pearl and tortoise-shell in front of the screen. The guardian of the *zaouia* could hardly realize the fact of Christians desecrating by their presence such holy ground. Running his amber chaplet through his hands with feverish haste he suddenly threw himself upon his face and probably prayed to be forgiven. Some Algerian soldiers who had followed us prostrated themselves before the tomb and eagerly kissed the edge of the palls through the metal lattice-work. Looking at the bright white marble pillars of the cloister my eye fell on one remarkable capital: at either corner a bird supported a Greek cross in the centre. The spoils of some fair Byzantine church had evidently been brought to honor the resting-place of the "Friend of the Prophet." — *Tunis, Past and Present.*

Searching for the Emperor Trajan's Ashes. — A Signor Gennarelli has applied to the Minister of Public Instruction for permission to excavate around the base of Trajan's column, where he expects to find nothing less than the sepulchral chamber containing that emperor's ashes preserved in an urn of gold, and in a letter addressed to the papers he sets forth the grounds on which he confidently bases his expectations. He quotes how Dion, Cassius, Eutropius, Cassiodorus, Lampidrius and others narrate that Trajan's ashes were brought to Rome and deposited in a costly urn of gold beneath the column still standing untouched in its place. But he adds, the column was erected some years previously, and therefore the urn could not have been buried beneath its pedestal. The chamber in which it was placed must have been situated immediately below the level on the one side or the other, and that the chamber so situated has never been violated in the course of centuries that have elapsed, and that the golden urn is safe within it, Signor Gennarelli undertakes to prove. — *London Times.*

An Invalids' Room in a Church. — In every congregation there are a few chronic invalids who would gladly attend worship for at least a portion of the service. For such is prepared in at least one church that we know of, on one side of the recess in which stands the pulpit, a room, with a window (invisible to most of the audience) which looks directly down on the preacher's desk. This apartment is divided by a thick wall from the main audience-room, and entered by a private door. In it are tables, chairs, lounges, and other conveniences. The inmates may sit or stand, lie or walk, cough when disposed, and leave the house at their pleasure, without disturbing the congregation. And to any building committee with a new church to erect let us say, Go and do ye likewise. — *The Advance.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

264,438. ELASTIC DOOR-CHECK. — Horace H. Burrill, Washington, Ind.

264,444. TRAVELLING CRANE.—Henry Davies, Newport, Ky.

264,460. MILK-HOUSE.—George W. Kennedy, Garnaville, Io.

264,463. FILTERING AND PURIFYING WATER IN WELLS.—George Koeppel, Alma, Wis.

264,469. HOISTING APPARATUS.—William B. Moore, Millsborough, Pa.

264,479. SCREW-NAIL.—Charles D. Rogers, Providence, R. I.

264,482. FLEXIBLE MATCHING AND VENEERING.—Levi S. Shreffler, Elmira, N. Y.

264,492. CLAW-HAMMER AND SCREW-DRIVER. — John A. Thayer, Somerville, Mass.

264,505. ORNAMENTATION OF BRICKS AND TILES. —James C. Anderson, Highland Park, Ill.

264,539. SASH-FASTENER. — Eleazur Kempshall, New Britain, Conn.

264,561. COMBINED DOOR-PLATE, LETTER-BOX AND BELL-PULL.—Charles H. Parmenter, Oakland, Cal.

264,565. HEATING-FURNACE. — Jeremiah J. Richardson, Brooklyn, N. Y.

264,568. FURNACE FOR PRIVIES.—William S. Ross, Madisonville, Ky.

264,575. LOCKING-LATCH.—John Simon, New York, N. Y.

264,577. SCAFFOLD. — George W. Smith, Harlansburg, Pa.

264,693. WATER-CLOSET.—James Hay and Robert H. Lecky, Allegheny, Pa.

264,700. DRYING FLOOR FOR MALT-KILNS. — William H. Hughes, Philadelphia, Pa.

264,706. PIPE-CONNECTION.—Patrick Keilt, Brooklyn, N. Y.

264,715. COMPRESSION-COCK. — Robert H. Lecky, Allegheny, Pa.

264,717. AUTOMATIC GEAR FOR PNEUMATIC SEWERAGE-CONDUITS. — Charles T. Liernur, Haarlem, Holland.

264,745. ELEVATOR.—George R. Peare, Lynn, Mass.

264,795. AUTOMATIC ELEVATOR.—George C. Tewksbury, Newark, N. J.

264,834. FIRE-ESCAPE. — Jacob C. Horton, New York, N. Y.

264,835. HEATING APPARATUS. — Jonathan Johnson, Lowell, Mass.

SUMMARY OF THE WEEK.

Boston.

BUILDING PERMITS. — *Brick.* — *Exeter St.*, opposite St. James Ave., Ward 11, for Massachusetts Institute of Technology, one-st'y hip drill hall, 51' 8" x 158' 6"; Jas. Fagin, builder.

Trinity Pl., near St. James Ave., Ward 11, for Henry B Williams, conservatory, 20' x 30'; Arthur E. Rendle, builder.

Wood. — *Gore Wharf, Magazine St.*, junc. Jeffries St., Ward 2, for Abiel Gore, mechanical, 17' x 30'; Abiel Gore, builder.

Bearse Ave., cor. Butler St., Ward 24, for J. G. Grossman, two-st'y dwell., 21' x 26'; J. H. Grossman, builder.

La Grange St., rear of, near Centre St., Ward 23, for Steone Morse, poultry-house, 10' x 40'; A. E. Byrne, builder.

Edgewood St., cor. Southwood St., Ward 21, for Geo. A. Smith, two-st'y dwell., 20' x 30'; A. D. Gould, builder.

Dorchester Ave., Nos. 151, 153, 155, Ward 13, for Wm. Peard, 3 two-st'y dwells. and stores, 20' 8" x 42' each; Wm. Peard, builder.

Orient Ave., near Elm St., Ward 1, for John Riley, dwell., 20' x 27'; Thomas Yeomans, builder.

Florence St., rear, near Poplar St., Ward 23, for Walter E. Whittimore, one-st'y mansard stable, 24' x 30'; Alex. H. Rogers, builder.

Medford St., nearly opposite North Mead St., Ward 1, for Henry Woods, Son & Co., two-st'y stable, 20' x 24'; Ira Hammond, builder.

Tremont St., No. 1680, rear of, Ward 22, for T. Quincy Browne, carriage-house, 19' x 45'; L. M. Burgess, builder.

Tremont St., near Oak Sq., Ward 25, for Hannah Long, two-st'y dwell., 20' x 28' and 28' x 37'; J. E. Burke, builder.

Baltimore.

CHURCH ADDITION.—Addition, 20' x 66', to St. John's (R.C.) Church, cor. Eager and Valley Sts.; also, new marble altars; cost, $8,000; Mr. E. F. Baldwin, architect; Mr. Jno. Stack, builder.

BUILDING PERMITS.—Since our last report twenty-three permits have been granted, the more important of which are the following:—

James Fox, 2 three-st'y brick buildings, East St., bet. Douglass and Low Sts.

A. J. Gettier, 2 three-st'y brick buildings, s w cor. Oregon St. and Cemetery Lane.

J. S. Farren & Co., two-st'y brick packing house, 60' x 60', Boston St., e of Concord St.

James Carrigan, 3 three-st'y brick buildings, Baltimore St., bet. Central Ave. and Lloyd St.

Geo. W. Hildebrand, 2 two-st'y brick buildings, Chestnut Alley, in rear of No. 217 Franklin St.

Henry Totte, two-st'y brick stable, in rear of Townsend St., bet. Oregon and Republican Sts.

Michael McDonnell, two-st'y brick building, Chestnut St., s of Douglass St.

John Ream, Jr., & Co., two-st'y brick shop, and one-st'y foundry, Wicomico St., s of Cross St.

Mrs. E. Hornig, two-st'y brick building, 16' x 26', in rear of s w cor. Charles and Randall Sts.

Brooklyn.

BUILDING PERMITS. — *Union St.*, n s, 95' w Seventh Ave., 2 three-st'y brownstone dwells.; cost, each, $7,000; owner, Caroline Zang, 98 Willoughby St.; architect and builder, Wm. Zang.

Nineteenth St., n s, 200' e Third Ave., three-st'y frame tenement; cost, $4,400; owner, John Fey, Twelfth St., near Third Ave.; architect, F. Ryan; builder, D. Ryan.

Court St., w s, 50' s Third Pl., two-st'y brick store and dwell.; cost, $2,800; owner, Mary E. Solomon, 96 Third Pl.; architect and builder, John W. Bailey; mason, J. J. Cody.

Pearl St., e s, 77' s High St., four-st'y brick factory; cost, $12,000; owner, B. T. Harris, 53 Murray St., New York; architect, Mercein Thomas; builders, A. Rutan and L. W. Seaman, Jr.

Myrtle Ave., No. 1239, w s, near Evergreen Ave., three-st'y frame store and tenement; cost, $4,000; owner, H. Steffens, 1251 Myrtle Ave.; architect, F. Holmberg.

Judge St., e s. 127' n Powers St., 2 four-st'y frame tenements; cost, each, $7,000; owner, Henry Kinn, Judge St.; architect and carpenter, Wm. Snowdon; mason, E. Buchelt.

Seventeenth St., No. 12, s s, bet. Fourth and Fifth Aves., three-st'y brownstone dwell.; cost, $7,000; owner, Henry W. Bisch, 171 Seventeenth St.; architect, J. F. Wood; mason, J. J. Cody; carpenter, not selected.

Adams St., 350' s e of Broadway, two-st'y brownstone dwell.; cost, $4,500; owner, Albert Houdlett, Pulaski St.; architect, F. E. Lockwood; builder, Fred. Herr.

Sterling Pl., n s, abt. 350' w Seventh Ave., 2 two-st'y brick stables; cost, each, $4,000; owners, John Francis and Norman L. Munro, Seventh Ave. and Lincoln Pl.; builder, J. B. Stringham.

Furman St., w s, fourth pier n Montague St., Wall St. Ferry, one-st'y frame storage shed; cost, $18,000; owners, Phelps Bros. & Co., 54 Brood St., New York; architect and builder, Warren Rosevelt.

Magnolia St., n s, 50' w Hamburg Ave., three-st'y frame tenement; cost, $4,000; owner, Fred. Kaiser, 148 Magnolia St.; builders, Fred. Platz and A. Hofgesang.

Conselyea St., n s, 200' e Ewen St., three-st'y frame tenement; cost, $4,500; owner, O. H. Doolittle, 255 South Third St.

Jefferson St., n s, 170' e Marcy Ave., 4 two-st'y brownstone dwells.; cost, each, $4,500; owner and builder, Harman Phillips, Brooklyn; architect, J. D. Reynolds.

Monroe St., n s, 225' w Franklin Ave., 7 two-st'y brownstone dwells.; cost, each, $5,000; owners, Lambert & Mason, 277 Carlton Ave.; architect, A. Hill.

Lynch St., n s, 125' from Broadway towards Harrison Ave., four-st'y brick factory; boiler-house and engine-room; cost, factory, $14,000, and other two, total, $1,800; owner, August Moll, 181 Hewes St.; architect, A. Herbert; builder, Th. Gibbons.

Marion St., n s, bet. Rockaway and Hopkinson Aves.; three-st'y frame tenement; cost, $4,000; owner, Henry Ekoff, Marion St.; builder, Nicholas McCormick.

Troutman St., No. 15, three-st'y frame dwell.; cost, $4,200; owner, Charles Mills; architect, John Platte; builder, Henry Loeffler.

Myrtle Ave., s s, 125' e Broadway, three-st'y brick cigar factory; cost, $6,000; owner, Charles Vogt, Broadway, near Myrtle Ave.; architect, John Platte; builder, T. Donlon.

Waverley Ave., w s, 143' s Myrtle Ave., two-st'y brick carriage house; cost, $4,636; owner, Charles E. Dingee, 226 Washington Ave.; architects and builders, Mills & Bush.

Ferris St., bet. Dikeman and Partition Sts., one-st'y brick boiler shop; cost, $7,000; owner, Lidgewood M'f'g Co., 96 Liberty St., New York; architect, J. V. Beekman; builders, P. Kelly & Son and Jas. Martin.

Lewis Ave., w s, 50' s Floyd St., two-st'y frame dwell.; cost, $4,000; owner, Weis Ketel, Meserole St., near Ewen St.; builders, Geo. Straub and J. Rueger.

Warren St., s s, 75' w Smith St., four-st'y brick flat; cost, $11,000; owners, architects and builders, M. Freeman's Sons.

Chicago.

PRICES. — No change in the prices of material this week. Brick is a little scare and somewhat stiffer, otherwise remains the same.

APARTMENT-HOUSE. — Mr. Harvey Gault will build a two-story apartment-house on Waubausia Ave., near Lincoln St., to cost $7,000. Mr. W. J. Brookes, architect.

HOUSE. — Mr. H. T. Monroe will build a fine residence on Park Ave., to cost $18,000. Mr. J. D. Ellis, architect.

BUILDING PERMITS. — Mrs. L Starr, three-st'y stores and flats, 42' x 64', 903 Madison St.; cost, $12,000.

Adam Press, two-st'y dwell., 25' x 59', 66 Lincoln Ave.; cost, $6,000.

A. H. Uphoff, 2 three-st'y dwells., 49' x 50', 3544 Wabash Ave.; cost, $12,000.

C. F. Gunther, six-st'y store, 25' x 100', 260 State St.; cost, $18,000.

S. M. Kelly, 3 two-st'y dwells., 50' x 60', 2965 Groveland Park; cost, $10,500.

Robert Law, six-st'y store, 99' x 150', Madison-st. Bridge; cost, $150,000.

D. Quill, 4 two-st'y stores and dwell., 58' x 102', Van Buren and Aberdeen: cost, $15,000.

A. Grannis, two-st'y dwell., 30' x 55', 2914 Indiana Ave.; cost, $12,000.

J. Cooney, 13 two-st'y flats, 40' x 260', Tallman and North Ave.; cost, $40,000.

D. G. Schwartz, three-st'y store, 536 North Clark St.; cost, $5,000.

S. C. Pardee, two-st'y dwell., 25' x 50', 402 State St.; cost, $6,000.

John Heron, two-st'y flats, 38' x 105', 117 S. Paulina St.; cost, $12,000.

B. & O. R. R., two-st'y passenger depot, 33' x 125', Michigan Ave.; cost, $15,000.

Henry Corwith, six-st'y store, 98' x 150', 124 Market St.; cost, $80,000.

Warder, Breshnell & Glasner, five-st'y warehouse, 80' x 200', Adams and Jefferson Sts.; cost, $70,000.

Gottfried Brewing Co., two-st'y barn, 36' x 100', Alexander & Stewart Aves.; cost, $5,000.

F. Kraennka, two-st'y dwell., 22' x 56', 694 Eighteenth St.; cost, $3,500.

D. Harry Hammer, two-st'y flats, 22' x 44', 3534 State St.; cost, $3,000.

Moses A. Naber, three-st'y dwell., 20' x 40', 47 Peck Ct.; cost, $5,000.

Jerome Beecher, 8 two-st'y dwells., 17' x 70', 2431 Forrest Ave.; cost, $30,000; W. A. Furber, architect.

Lutheran School, two-st'y school-house, 24' x 46', 683 Loomis St.; cost, $2,900.

P. McNally, two-st'y dwell., 21' x 56', 753 Loomis St.; cost, $4,000.

Aug. Schlechte, two-st'y dwell. and store, 24' x 50', 902 Milwaukee Ave.; cost, $3,500.

Board of Education, three-st'y school-house, 79' x 122', cor. Wendell and Wells Sts.; cost, $55,000.

John C. Fitzgerald, two-st'y dwell., 20' x 50', 3647 Dearborn St.; cost, $3,700.

F. Schofield, two-st'y dwell., 20' x 38', 924 Jackson St.; cost, $2,500.

L. Z. Leiter, 6 one-st'y stores, 142' x 200', State and Van Buren Sts.; cost, $12,000.

Henry Corwith, three-st'y store and dwell., 25' x 85', 522 West Madison St.; cost, $10,000.

John C. Fitzgerald, two-st'y dwell., 20' x 50', No. 3647 Dearborn Ave.; cost, $3,500.

F. Schofield, two-st'y dwell., 20' x 38', No. 924 Jackson St.; cost, $2,500.

John Campbell, two-st'y dwell., 20' x 60', No. 16 Laflin St.; cost, $5,000.

Louis Hirsch, two-st'y dwell., 20' x 50', No. 210 W. Division St.; cost, $3,500.

Mrs. Ruth A. Young, two-st'y dwell., 20' x 50', No. 1262 Harrison St.; cost, $3,000.

Wm. J. O'Brien, three-st'y dwell., 20' x 80', No. 2765 Archer Ave.; cost, $10,000.

Charles Matthias, 2 three-st'y stores and dwells., 40' x 60', No. 467 N. Clark St.; cost, $15,000.

Gus. Knight, 2 three-st'y dwells., 40' x 58', No. 62 Lincoln Ave.; cost, $11,000.

J. R. Bowie, three-st'y dwell., 23' x 63', No. 706 W. Jackson St.; cost, $5,000.

P. J. McGennis, two-st'y dwell., 24' x 40', No. 1069 N. Halsted St.; cost, $5,000.

C. W. Division R. R., two-st'y car-house, 128' x 162', Park and Western Aves.; cost, $30,000.

C. W. Division R. R., two-st'y stable, 114' x 162', Park and Western Aves.; cost, $30,000.

J. V. Farwell, two-st'y residence, 60' x 70', s w cor. Pine and Pearson Sts.; cost, $100,000.

H. Fleutz, three-st'y flats, 23' x 80', No. 608 La Salle Ave.; cost, $10,000.

J. F. Dale, 4 two-st'y dwells., 21' x 48' each, No. 1216 and 1222 Jackson St.; cost, $12,000.

J. Hutchman, two-st'y dwell., 22' x 54', No. 27 Howe St.; cost, $3,000.

Aug. Muller, two-st'y flats, 24' x 48', No. 11 Granger St.; cost, $5,000.

A. Wells, two-st'y dwell., 20' x 60', No. 13 Groveland Park; cost, $6,000.

Jacob Derubach, four st'y store and dwell., 25' x 80', No. 397 W. Chicago Ave.; cost, $14,000.

A. S. Watkins, 4 one-st'y cottages, 20' x 42', No. 3751 La Salle St.; cost, $3,200.

Jas. Griffin, two-st'y addition, 25' x 86', No. 3307 State St.; cost, $3,000.

J. C. Schumacher, one-st'y cottage, 20' x 50', No. 686 Twenty-second St.; cost, $2,500.

A. Newell & Co., three-st'y factory, 40' x 125', Garfield and Racine Aves.; cost, $12,000.

Cincinnati.

LACK OF BRICKLAYERS.—The demand for bricklayers far exceeds the supply. This can probably be accounted for by the fact that all the buildings are being pushed in order that they may be got under roof before the winter sets in. The union price for bricklayers is $4.50 per day, but some bosses are offering $5 per day. This will no doubt lead the men to strike for $5 all along the line on or before the first of next year, and thus business will receive another set-back. Cincinnati really needs about 100 more brick-masons.

BUILDING PERMITS. — Keume & Rosenthal, three st'y brick dwell., cor. Myrtle Ave. and Madison Pike; cost, $5,000.

John Donnetta, four-st'y brick factory, Harrison Ave., near Western Ave.; cost, $9,000.

Aug. Heistman, addition to three-st'y brick dwell., Baymiller St., near Clark St.; cost, $3,000.

Mr. Otto Sniger, two-st'y brick dwell., State Ave., near Warsaw Pike; cost, $3,000.

Fred Otte, three-st'y brick dwell., 539 Race St.; cost, $5,000.

C. G. Van Zant, 5 two-st'y brick dwells., John St., near Betts St.; cost, $8,000.

H. Haverbush, two-st'y brick dwell., State Ave., near Stabler St.; cost, $5,000.

Nathaniel Ropes, four-st'y brick dwell., Main St., near Ninth St.; cost, $15,000.

Folding Hat-Rack Co., four-st'y brick factory, 201 Front St.; Chas. Crapsey, architect; cost, $8,000.

J. G. Buddeke, addition to three-st'y brick dwell., Linn St, near Clark St.; cost, $3,200.

Wm. Ickoff, two-st'y brick dwell., Brown St., near Eliza St.; cost, $4,000.

Aug. Weisgerberg, two-st'y brick dwell., Harrison Ave.; cost, $1,000.

New York.

BUILDING MATERIALS. — There have been but few changes in the prices of building material lately, and the figures prevailing being fairly low in conjunction with the settled rates of wages afford a good opportunity to build at reasonable rates.

RESIDENCES. — At the cor. of Fifty-fourth St. and Broadway, 4 brick and stone houses, five-st'y, are to be built at a cost of about $65,000; from designs of Mr. A. B. Jones.

BUILDING PERMITS. — *Second Ave.*, e s, 25' 6" s One Hundred and Sixth St., four-st'y brick store and tenement; cost, $10,000; owner, Charles F. Helms,

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Second Ave., s e cor. One Hundred and Sixth St.; architect, A. Spence; builder, not selected.

East Eighty-fifth St., No. 326, five-st'y brick and brownstone tenement; cost, $12,000; owners, Emeline and Elizabeth Johnston, by Wm. Johnston, agent, 445 East Eighty-fourth St., architect, A. B. Ogden.

Railroad Ave., e s, 300' s One Hundred and Eighty-third St., 2 three-st'y frame dwells.; cost, each, $2,750; owner, Caius V. Folin, Fordham, N. Y.; architects and builders, C. V. Folin & Son.

Forty-first St., s s, 130' e Fourth Ave., four-st'y brick building; cost, $25,000; owner, Manhattan Storage and Warehouse Co., 2 Exchange Ct.; architect, J. E. Ware; builder, Richard Deeves.

Broadway, Nos. 600 *and* 602 *and* 134 *and* 136 *Croby St.*, six-st'y iron and brick store; cost, $150,000; owner, Elizabeth W. Aldrich, 200 Madison Ave.; architect, S. A. Warner; builders, J. H. Masterton and McGuire & Slone.

Ninth Ave., n w cor. Seventy-first St., 3 five-st'y brownstone tenements; cost, each, $18,000, and $36,000, and $36,000; owners, Noble & Post, 1238 Third Ave.; architect, F. T. Camp.

Private St., cut through from St. Nicholas Ave., e s, 75' above One Hundred and Sixtieth St., 20 two-st'y frame cottages; cost, each, $3,000; owner, Jas. E. Ray, 322 East One Hundred and Twentieth St.; architect, G. Robinson, Jr.

Grand St., No. 385, five-st'y brick store; cost, $15,000; owner, James Barclay, 64 West Thirty-eighth St.; architect, J. Boekell.

West Thirty-eighth St., Nos. 431 *and* 433, 2 five-st'y brick tenements; cost, each, $14,000; owner, Ernst Von Au, 149 Adams St., Brooklyn; architect, J. Hoffman.

Forty-second St., s s, 100' w Second Ave., five-st'y brick tenement; cost. $18,000; owner, Max Schroff, 298 East Eighty-first St.; architect, Charles Baxter.

Ninety-seventh St, s s, 300' w Second Ave., 8 four-st'y brownstone tenements; cost, each, $15,000; owner, Samuel Simons, 13 Sheriff St.; architect, Chas. Baxter.

Ninety-eighth St., s s, 110' e Third Ave., 5 four-st'y brick and brownstone trimmed tenements; cost, each, $18,000; owner, Jacob Jenney, 114 East One Hundred and Tenth St.; architect, Chas. Baxter.

Third Ave., e s, 20' s proposed One Hundred and Fifty-fifth St., three-st'y brick tenement; cost, $5,000; owner, Henry Lerch, One Hundred and Forty-fifth St., near Brook Ave.; architect, A. Reiffer; builder, not selected.

Eighty-first St., s s, 203' 4" e Third Ave., five-st'y brick tenement; cost, $16,500; owner, Mrs. Lottie Seebald, 1517 First Ave.; architect, J. C. Burne; builder, Peter Seebald.

Willis Ave., No. 311, w s, 25' n One Hundred and Fortieth St., three-st'y brick tenement; cost, $9,000; owner, Carl Sotscheck, on premises; architect, J. F. Burrows.

Seventy-eighth St., s s, 175' w Tenth Ave.; Seventy-eighth St., s s, 575' e Tenth Ave., 6 four-st'y brownstone dwells.; cost, each, $10,000; owner, Walter F. Shibley, 20 Nassau St.; architect, Wm. Baker.

Ninety-third St., s s, 175' w Eighth Ave., three-st'y brick and brownstone dwell.; cost, $10,000; owner, Mrs. Robt. M. Reynolds, 333 West Ninety-second St.; architects, D. & J. Jardine.

Pier, foot of Sixty-eighth St., North River, one-st'y frame freight shed; cost, $16,000; owner, N. Y. C. & H. R. R. Co., Grand Central Depot; architect and builder, Joseph Richardson.

Wooster St., Nos. 42 *and* 44, six-st'y brick and stone store; cost, $35,000; owner, Edward N. Tailer, 11 Washington Sq.; architect, J. M. Slade; builders, A. G. Bogert & Brother.

East Eleventh St., No. 808, three-st'y brick factory and stable; cost, $7,000; owner, George Ehret, Fourth Ave., s e cor. Ninety-fourth St.; architect, J. Kastner.

Carmine St., No. 37, five-st'y brick tenement; cost, about, $23,500; owner, Lawrence Van Wart, 314 West Fifty-sixth St.; architect, J. Stroud; builders, Alex. Brown and D. Mitchell.

East One Hundred and Nineteenth St., Nos. 347 *and* 349, 2 four-st'y brick and stone tenements; cost, each, $9,000; owner, Thomas B. Tappen, 2279 Third Ave.; architect, J. S. Wightman; builders, J. and W. C. Spears and L. Daly.

Avenue A, w s, 95' 4" s Seventy-first St., five-st'y brick tenement; cost, $16,600; owner, Thomas McMahon; architect, John C. Burne; builder, not selected.

Lexington Ave., n e cor. One Hundred and Nineteenth St., three-st'y brick stable; cost, $17,000; owner, William H. McCarthy, 33 East One Hundred and Thirty-third St.; architect, J. C. Burne; builder, not selected.

Broadway, s w cor. Fifty-fourth St., 4 five-st'y brick dwells.; total cost, $64,621; owner, Victor B. Deplerris, 234 West Fifty-fourth St.; architect, A. B. Jones; builders, Jno. Banta and Bartell Smith.

Ninth Ave., n e cor. One Hundred and Twenty-fifth St., 5 four-st'y brick stores and tenements; cost, each, $17,000; owner and architect, Silas M. Styles, 143 West One Hundred and Thirtieth St.

Madison Ave., No. 721, three-st'y brick school; cost, $6,000; owner, Henry B. Chapin, 1076 Madison Ave.; architect, J. E. Terhune.

Seventy-third St., s s, 250' e Tenth Ave., 5 four-st'y brownstone dwells.; cost, each, $22,000; owner and builder, George J. Hamilton, 278 Fifth Ave.; architect. M. V. B. Ferdon.

One Hundred and Eighth St, s s, 100' e Third Ave., four-st'y brick and brownstone tenement; cost, $9,000; owner, Wilhelmine Juch, First Ave., n w cor. One Hundred and Fourth St.; architect, Fr. S. Barus; builder, W. Juch.

One Hundred and Eighth St., s s, 115' e Third Ave., 9 four-st'y brick and brownstone tenements; owner, architect, and builder, same as last.

One Hundred and Tenth St., n s, 75' e Second Ave. and One Hundred and Eleventh St., s s, 75' e Second Ave., 11 five-st'y brick tenements; cost, each, $10,000; owner and builder, same as last.

Elton Ave., e s, 25' n One Hundred and Fifty-seventh St., four-st'y brick tenement; cost, $7,000; owner, John Paul, One Hundred and Fifty-seventh St. and Elton Ave.; architect, A. Pfund.

One Hundred and Fifth St., n s, 323' e First Ave., two-st'y brick stable; cost, $3,500; owners, Nathan & Dreyfus, 92 Liberty St.; architects, H. J. Schwarzmann & Co.; builders, List & Lennon and John F. Moore.

One Hundred and Thirty-second St., s s, 175' e Eighth Ave., 10 three-st'y and basement brownstone front dwells.; cost, each, $14,000; owner, Saml. S. Hinman, 413 Pleasant Ave.; architects, Cleverdon & Putzel.

Third Ave., w s, 125' s One Hundred and Fifty-eighth St., three-st'y frame tenement; cost, $4,000; owner, Mathilde Kromm, 781 North Third Ave.; architect, Theo. Dieterlen.

Willis Ave., s e cor. One Hundred and Forty-seventh St., four-st'y brick tenement and store; cost, $6,000; owner, Wm. Dougherty, Willis Ave. and One Hundred and Forty-seventh St.; architect, Arthur Arctander.

West Thirtieth St., No. 530, three-st'y brick factory; cost, $5,000; owner, John Dawson, 505 Tenth Ave.; architect, C. F. Ridder, Jr.; builder, not selected.

Alterations.—*Broadway*, e s, bet. Reade and Chambers Sts., extending about 225' on each st., raised from five and six stories to uniform height of seven stories, and all the buildings joined into one, and altered for offices; owner, Mrs. Cornelia M. Stewart, Fifth Ave., n w cor. Thirty-fourth St.; architect, E. D. Harris.

North William St., Nos. 26 *and* 28 to be connected, four-st'y brick extension, etc.; cost, $5,000; lessee, New York Star Newspaper Co., on premises; architect, J. B. Snook; builder, not selected.

Tenth Ave., Nos. 477 *and* 479, six-st'y brick extension; cost, $25,000; owner, Franklin E. James, 54 East Fifty-seventh St.; architect, S. D. Hatch; builder, not selected.

Warren St., Nos. 32, *and* 102 *Chambers St.*, add one st'y, new cross walls, etc.; cost, $40,000; owner, Elizabeth W. Aldrich, 200 Madison Ave.; architect, S. A. Warner.

East Seventieth St., No. 2, raise stable roof, etc.; cost, $5,000; owner, J. M. Fiske, Fifth Ave., s e cor. Seventieth St.; architect, S. D. Hatch.

Third Ave., No. 390, interior alterations, etc.; cost, $5,000; owner, Daniel D. Gassner, 2 Neilson Pl.; architects, Babcock & McAvoy; builder, not selected.

Mott St., No. 35, raised two stories, also four-st'y brick extension; cost, $3,500; owner, James Naughton, 40 Mott St.; architect, A. Spence; builder, not selected.

Mott St., No. 37, four-st'y brick extension; cost, $10,000; owner, architect, and builder, same as last.

Monroe St., No. 291, through to No. 398 Madison St., repair damage by fire; cost, $12,250; owner, Joseph M. Stuart, Princeton, Mass.; architect and carpenter, Henry Wallace; masons, Fellows & Cary.

Forsyth St., No. 209, raised one-st'y; cost, about $3,000; owners, George and Valentine Fischer, 60 and 62 Second Ave.

Madison Ave., s e cor. Fifty-ninth St., two-st'y brick extension; cost, $25,000; owners, Panorama Co., Paris, France; architect, J. M. Carrere, Jr.; builder, Gustave Humblet.

East Seventy-fifth St., No. 25, s w cor. Madison Ave., one-st'y brick extension; cost, $3,500; owner, W. S. Maddock, 231 Broadway; engineers, Maclay & Davies.

Fifth Ave., Nos. 485, 487, 489 *and* 491, *and East Forty-second St., No.* 2., seven-st'y brick extension, alterations for apartments and show-rooms; cost, $125,000; lessees, Pottier & Stymus M'f'g Co., Lexington Ave., Forty-first and Forty-second Sts.; architect, S. D. Hatch; builders, A. A. Andruss & Son and James Elgar.

West Forty-ninth St., Nos. 618 *to* 638, add one st'y; cost, $5,000; owners, Hardman, Dowling & Peck, 232 West Fiftieth St.; architect and builder, A. Gibbins.

East Fifty-third St., No. 162, add one st'y; cost, $5,000; owner, Amanda Fallhee, 149 East One Hundred and Fifty-third St.; builders, Nason & Hollister.

First Ave., No. 447, four-st'y brick extension; cost, about $15,000; owner, George Matthews, 135 East Seventy-first St.; architect, A. F. Oakey.

Baxter St., Nos. 149 *and* 151, set boiler in basement, and build new chimney; cost, $3,500; owner, Joseph H. Didier, 117 East Twenty-fourth St.; architect, William Jose.

East Seventeenth St., No. 113, new front stoop, new front and vestibule doors, etc.; cost, $3,000; owner, Wm. S. Livingston, on premises; architect, Emanuel Gandolfo; builders, John Kelly, and John T. Smith.

Philadelphia.

Material Market.—Quotations represent present prices obtained in this market, prices firm in lumber, brick, etc.

Factory.—At Front St. and Lehigh Ave. B.F. Thompson is having the following manufacturing buildings erected: Main building, (three-st'y and basement), 40' x 107'; dye-house, 29' x 47'; boiler-house, 15' x 44'; engine-house, 12' x 32'; weave-shed, 45' x 80' 4"; J. F. Stuckert, architect.

Boiler-House, s e cor. Seventh and Dickinson Sts., three-st'y brick building, 60' x 154' 4"; engine and boiler-house, 29' x 94' 6"; J. F. Stuckert, architect.

Building Permits.—*Eighth St.* n w cor. Morris St., 2 two-st'y dwells., 16' x 40'; D. W. Campbell, owner.

Sixty-fourth St., cor. South St., two-st'y factory, 32' x 60'; Jacob Zell, contractor.

Erie Ave., cor. Trenton Ave., one-st'y shed, and three-st'y factory, 100' x 115' and 43' x 250'; Einwechter & Sons, contractors.

Ripka St., n of Winchester St., 4 three-st'y dwells., 13' x 30'; Sturges & Heath, contractors.

Fifth St., e s, n of Oxford St., four-st'y warehouse, 55' x 90'; Thos. Little, contractor.

Willard Ave., s s, w of Emerald St., 3 two-st'y dwells.; 17' x 30'; J. M. Buchanan.

Adams St., n s, w of Thompson St., 3 two-st'y dwells., 18' x 29'; J. M. Buchanan.

Cumberland St., s s, e from Salmon St., 9 two-st'y dwells., 14' x 42'; Chas. Spoerl, owner.

Collins St., e s, 107' n of Huntington St., one-st'y storehouse and stable, 40' x 42'; Bernard McSloy.

Main St., e s, s of Sharpnack St., three-st'y store and dwell., 20' x 65'; H. H. Buzby.

Cambria St., s s, bet. Staunton St. and Frank'd R'd, two-st'y dwell., 17' x 36'; Jno. Pattor, owner.

Twenty-second St., cor. Wright St., s e, two-st'y stable, 24' x 28'; A. Sandberger, owner.

Fairhill St., e s, n of Lehigh Ave., 2 two-st'y dwells., 17' x 38'; W. Barnes, contractor.

Twelfth St., cor. Susquehanna Ave., one-st'y carshed, 22' x 200'; Citizens Pass. Riv'y, owners.

Lawrence St., Nos. 1512 *and* 1514, 2 three-st'y dwells., 16' x 37'; Geo. Kessler.

Germantown R'd, cor. Tenth St., one-st'y meeting-house, 38' x 58'; Wendell & Smith.

Broad St., w s, s of Dickinson St., 33 dwells.; W. R. Matchett, owner.

Eustis St., n s, bet. Fourth and Fifth Sts., 8 two-st'y dwells., 15' x 30'; A. M. Greene, owner.

Taylor St., No. 3862 (Nicetown), two-st'y dwell., 14' x 28'; W. Wagstaff, owner.

Twenty-eighth St., cor. Fletcher St., three-st'y stable, 16' x 60'; Saml. Stewart, contractor.

Dickinson St., n s, w of Broad St., 16 three-st'y dwells., 16' x 50'; W. R. Matchett, owner.

Dickinson St., s s, e of Fifteenth St., 11 three-st'y dwells., 16' x 50'; W. R. Matchett, owner.

Freedland St., s s, near Penn St., 5 three-st'y dwells., 16' x 32'; Wm. Rainn, owner.

Second St., e s, n of Greenwich St, 2 two-st'y dwells., 16' x 32'; Chas. H. Clark, owner.

Sixteth St., cor. Hazle Ave, two-st'y dwell., 16' x 32'; Jos. Addison, owner.

Wharton St., n s, 66' e of Fifteenth St., 2 three-st'y dwells., 16' x 70'; Jas. McVicker, contractor.

Swanson St., n w cor., Moore St., two-st'y factory, 41' x 126'; L. J. Hirst, contractor.

Woodland Ave., s s, e of Seventy-first St., three-st'y dwell., 20' x 34'; Michael Bernard, owner.

Westmoreland Ave., n e cor. Kensington Ave., two-st'y store and dwell., 19' x 56'; Thos. Gormley, owner.

Ontario St., s s, e of Eighteenth St., 2 three-st'y dwells., 18' x 44'; H. A. Miller, contractor.

South Thirteenth St., No. 1210, three-st'y dwell., 19' x 44'; C. E. Paine & Son, contractors.

Sharp St., n w cor. Adams St., three-st'y dwell., 19' x 46'; McIlvain & Cunningham, contractors.

Green St., No. 715, wareroom and office, 20' x 34'; Myers & Campbell, contractors.

High St., s s, e of Morton St., three-st'y dwell., 17' x 44'; McLaughlin & McNamara.

Twenty-third St., e s, s of Norris St., 2 two-st'y dwells., 17' x 45'; Jno. Klebe, contractor.

South Sixteenth St., No. 767, three-st'y dwell., 16' x 48'; W. S. Williamson, contractor.

York St., n s, e of Frank'd Road, two-st'y store and dwell., 18' x 40'; A. T. Richards, contractor.

Leverington Ave., s s, bet. Ridge Ave and Mitchell St., 2 two-st'y dwells., 16' x 39'; Jacob Shingle, owner.

Twentieth St., w s, e s Woodstock St., 4 three-st'y dwells., and 3 two-st'y dwells., 12' x 35' and 12' x 36'; Henry Freeman, owner.

Powellton Ave., w s, bet. Thirty-first and Thirty-second Sts., 16 three-st'y dwells., with 4 stores, 15' x 57' and 18' x 57'; Wendell & Smith.

Girard Ave., s e s, bet. Palmer St. and Montgomery Ave., two-st'y store and dwell., 15' x 48'; A. Hetzel & Son.

Sloane St., Nos. 134 *and* 136, w s, 2 two-st'y dwells., 15' x 30'; D. R. Bering, owner.

Thirteenth St., w s, s of Diamond St., 3 three-st'y dwells., 17' x 69'; J. M. Sharp, owner.

Park Ave., s e and s w cors. Diamond St., 10 three-st'y dwells., 16' x 69'; J. M. Sharp, owner.

Frankford Ave., Nos. 4417 *and* 4419, two-st'y stable and carriage house, 36' x 40'; R. B. Burns, owner.

Wissahickon Station, one-st'y railroad station, 21' x 70'; Tourison Bros. contractors.

Orkney St., w s, n of Cumberland St., 2 three-st'y dwells., 15' x 26'; Jno. Mitchell, contractor.

Emerald St., n e cor. Huntingdon St., three-st'y addition to dry-house, 18' x 23'; Einwechter & Sons, contractors.

Thirty-seventh St., n e cor. Aspen Sts., 14 two-st'y dwells., 14' x 30'; Lewis Smith, contractor.

Dickinson St., three-st'y factory, 56' x 151'; Wm. Steel, contractor.

Dickinson St., engine and boiler-house, 27' x 90'; Wm. Steel, contractor.

Howard St., e s, s of Susquehanna Ave., three-st'y dwell., 20' x 45'; Wm. Steel, contractor.

Thirty-eighth St., s e cor. Sycamore St., 3 two-st'y dwells., 18' x 42' and 24' x 46'; H. Grace, contractor.

Pulaski Ave., w s, bet. Seymour St. and Fisher's Lane, three-st'y dwell., 45' x 68'; Kinnear & Sons, contractors.

Hancock St., s w cor. Coulter St., three-st'y dwell., 30' x 50'; Kinnear & Sons, contractors.

East Somerset St., Nos. 7 *and* 9, 2 three-st'y dwells. and alterations, 16' x 40'; Charles Roth, contractor.

Venango St., n s, w of Delaware Ave., 2 fertilizing buildings, 20' x 54' and 52' x 122'; M. L. Shoemaker & Co.

St. Louis.

Plasterers' Union.—The journeymen plasterers have organized a national union, with Michael Mulvihill, of Cincinnati, President; John Carter, of St. Louis, Vice President; Joseph Kennedy, of Cleveland, Secretary, and Jacob Mathias, of Indianapolis, Treasurer. The next meeting will be held in Cincinnati on the 21st of July, 1883.

Building Permits.—Thirty-seven permits have been issued since our last report, of which nineteen are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows:—

Henry Kohring, two-st'y brick dwell.; cost, $3,000; architect, May; contractors, Forwegge & Wamhoff.

August Krome, two-st'y brick dwell.; cost, $3,500; contractor, F. Shuermann.

Thomas Noonan, two-st'y brick dwell.

J. M. Ghio, two-st'y brick dwell.; cost, $14,000; architect, Grable; contractor, J. H. Dunlap.

E. J. Gay, four-st'y warehouse; cost, $29,000; contractor, J. L. Guedry.

Vane & Calvert, three-story brick store and dwell.; cost, $21,000; architect, J. D. Fitzgibbons.

J. Boehmann, two-st'y brick dwell.; cost, $4,500; architect, Beinke; contractor, J. Boehmann.

General Notes.

Andover, O.—G. H. Merrill, frame dwell.; cost, $4,000; S. W. Foulk, architect.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 354.

OCTOBER 7, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE New Jersey State Board of Health has undertaken a work which we hope it will carry out thoroughly. Within ten years the coast of that State, once a desolate line of sand hills, has been taken up for summer hotels and cottages, and thousands of new houses have been built on or near the beach from Sandy Hook to Cape May. As usual in such places little care has been taken of sanitary matters, and the dry, sandy soil, which in its natural state would be nearly perfect as the substratum for dwellings, has become saturated with filth in many places. The inevitable consequences have now begun to appear, and typhoid fever and malaria have this year invaded places supposed to be exempt from them. As, according to the New York *Tribune*, "the crop of summer boarders is regarded in New Jersey as more profitable even than that of sweet potatoes," the Board of Health, like wise guardians of the interests of their fellow-citizens, have now instituted an inquiry into the causes of the ailments which afflict their visitors, and propose to examine all the resorts along the coast. We trust that they will not content themselves with investigation alone, but will enforce with decision the measures which they may judge necessary for remedying the evils complained of.

THE people of Newark and Jersey City must have a certain curiosity to know what will be the next foreign ingredient mixed with their drinking water. It is but a few months since some one called attention to the fact that not only was the whole of the sewage of Paterson and several other towns carried down by the river to supply Jersey City and Newark, but that a considerable portion of the sewage of Newark itself was carried back at each flood-tide to the "intake" of the water-works. An investigation was then instituted, which resulted in finding a beneficent paper-manufacturer somewhere up the stream, who said that he discharged so much carbolic acid from the waste of his mill into the river that it neutralized the sewage from the cities above, and made the water "more healthful and pleasant than it would otherwise be." Not long afterward this wholesome compound of sewage neutralized with carbolic acid received an additional flavor by the breakage of a coal-oil pipe-line, which covered the river with oil to a considerable depth; and very recently, just after the late heavy rains had filled the channel to overflowing, a fresh discovery was made, that a ton of arsenic had been washed away by the flood in a suburb of Newark, and had been carried into a tributary of the Passaic. As a ton of arsenic, according to the usual estimate, would furnish a fatal dose for six millions of people, it is not surprising that the drinkers of Passaic water were alarmed, and their fears were not quieted until it was ascertained that the Second River, into which the poison escaped, joined the Passaic a little below the Newark Water-Works, and the current of the Passaic was so strong, owing to the flood, that there was little danger of its being reversed by the tide.

THE venerable Ashbel Welch, President of the American Society of Civil Engineers, died at Lambertville, N. J., last week. Born in 1812, Mr. Welch had in seventy years of an active and industrious life done much for the advancement of the profession of engineering, as well as for his own reputation. At eighteen years of age he was engaged as assistant on the Lehigh Canal, with several others who have since, like himself, risen to eminence. His skill and judgment brought him constant employment, and for many years he was closely identified with the great railroad works in and about the State of New Jersey. For fifteen years he was President of the United New Jersey Railroad and Canal Company, and was active in promoting the consolidation of the companies which now compose the system. His enterprising turn of mind led him, while still a young man, to join with Captain Stockton in the experiments which led to the construction of the Princeton, the first screw steamer ever built; and many improvements in the casting of heavy ordnance were made under his direction. Last January he was chosen President of the Society of Civil Engineers, and continued the practice of his profession until the last, being at the time of his death consulting engineer of the New York, West Shore and Buffalo Railroad.

THE enormous building of the State, War and Navy Departments, at the foot of Pennsylvania Avenue, in Washington, does not seem to have been constructed with the solidity befitting its importance. Some changes were recently made there, by which a number of clerks were assigned places in rooms formerly occupied for storage of papers, and on removing the papers to make room for desks it was found that the copper roof of the building had leaked badly, and that, perhaps on that account, the plastering had broken away, and had either fallen, or was so insecurely held to the laths that it was dangerous to occupy the room. The plaster is said to have been so thin that the laths were almost visible through it, and extensive repairs are now in progress to make the place fit for use. We should not ourselves be sorry to see an examination of the whole building made, say by some army engineer. Our own impression is that certain other details of the workmanship of this costly structure besides the plastering would bear criticism.

A FEW weeks ago a certain Mr. Hendricks, who resided on Wallace Street in Philadelphia, sent word to his landlord that there was a crack in the rear wall of his house, extending from the basement nearly to the eaves, and that unless it were repaired at once he should move away at the end of the month. Other serious cracks, which appeared before, had been remedied by the simple process of filling them with mortar, but this one seemed to increase in size every day. The peril did not, however, seem to be immediate, and Mr. Hendricks left the city on business. While he was gone there was no one to watch for the signs of approaching danger, and one morning about five o'clock the house suddenly collapsed, all the walls falling outward, and letting the floor, with the furniture and nine persons, most of whom were quietly asleep, drop to the basement. Fortunately, with the exception of trifling bruises from falling plaster and timbers, no one suffered any injury, so that the landlord will escape pursuit for manslaughter, but it is not unpleasant to reflect that his house is probably a total loss to him, since there is no insurance against such accidents.

CAPTAIN E. M. SHAW, the distinguished Chief of the London Fire Brigade, made recently a short visit to this country, and on the eve of his departure for home confided to a newspaper reporter his impressions of the efficiency of the American methods for extinguishing fires, which were by no means favorable. His first criticism, that the interference of the firemen with politics, or of politics with the firemen, or both, is injurious to the service, is certainly fully justified; but some expressions in regard to the ignorance of their business displayed by American firemen, as well as in relation to the superiority of the English men and engines, may be taken with considerable allowance. It is doubtless true, as Captain Shaw asserts, that the London Fire Brigade protects a much larger area than New York, at less cost and with less loss; but the difference must lie partly, if not mainly, in the inferior methods of building pursued among us. The interminable furrings, which in this country hold a shell of lath and plaster within the walls and roof of so-called substantial buildings, are in Europe little known, and the rapid spread of a conflagration, concealed and out of reach in the wood-lined cavities of floors and walls, must be a phenomenon much less common in London than in the

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cities of the United States. Moreover, our universal hot-air furnaces do much to kindle the fires which the practice of furring renders uncontrollable, and the prodigal use of combustible material gives peculiar fury to the flames. Captain Shaw says that "American firemen have no idea of the work to be done at a fire, or the way to do it," and although we know the incorrectness of this assertion it is not difficult to imagine that the impossibility in our buildings of determining the vulnerable point of a fire, which if kindled in the basement is most likely to break out in the roof, may give an air of random effort to the work of our men in the eyes of one accustomed to deal with solid walls and exposed construction.

The *Fireman's Journal* publishes a letter from a correspondent in Tokio, Japan, who tells some surprising stories about fires in that city. Soon after his arrival in Japan he witnessed a terrible conflagration, which swept street after street, until it was stopped by the impassable barrier of a canal. The next day, after relating his experience to a native acquaintance, he was astonished to hear the latter reply that it was "not much of a fire,—not more than a thousand houses burned." Further experience showed him that his friend was right, and it was not long before another occurred which consumed fifteen thousand houses, followed by a third, which destroyed seven thousand more. The greatest conflagration in the history of Tokio, about a hundred years ago, burned everything in its way for nine miles across the city. Although the roofs of the houses are usually tiled, the rest of the construction is very light, and there is no protective service worthy of the name; but merchants who have valuable stocks of goods contrive to secure them from danger by storing them in buildings constructed of bamboo lattice-work, thickly plastered with mud dug from the canals. The windows are small, and are furnished with shutters of a similar frame-work, also plastered with mud. Tubs of fresh mud stand always in readiness, and on the approach of a conflagration the proprietor plasters up the crevices which the sun soon causes in the original coating. This done he and his wares are safe, and the fire beats on the building in vain. The number of these "kuras" has much increased lately, and in some places they line whole streets, which effectually resist the spread of fires in their neighborhood.

A rather singular case is considered in the article on Jurisprudence of Building in the last number of *La Semaine des Constructeurs*, which contains so exact a statement of the extent of the responsibility of architects as to be worth a brief mention. It seems that a certain architect was employed by a proprietor residing at a distance to build a villa. The first estimate of the cost amounted to twenty-two thousand francs; but this was revised and increased to twenty-five thousand. The actual expense of the building, including additions of fencing and shed, was forty-two thousand francs. The architect brought in a bill for commission on the whole forty-two thousand francs, which the owner refused to pay, offering instead the usual percentage on the estimated cost of twenty-five thousand. This the architect declined to accept, and claimed his whole bill. The proprietor then, to justify himself for refusing payment, represented that the architect had injured him in various ways. In the first place, he had spent on the buildings nearly twice his original estimate; in the second place, he had failed to exercise proper care, in ordering double sashes and blinds in places where they were unnecessary, in planning corridors in the interior of the house only twenty-three inches wide, so that they could not be used for passage-ways and needed to be enlarged; and in allowing a beam to be built into a chimney, under a fireplace, which could not be used in consequence. In view of these things the proprietor demanded that the architect should pay the cost of enlarging the corridors, damages for the loss of the use of the fireplace, and reimbursement of the cost of the unnecessary outside sashes and blinds; besides the expense of modifying a lightning-rod which was asserted to have been improperly placed. The correspondent who asks the opinion of *La Semaine*, and who seems to be an impartial observer of the dispute, adds that the assertions of the proprietor in regard to matters of fact were correct; but that he had inhabited the house for two years without making any complaint, and that it was not until the architect had sent in his bill that his sufferings seemed to begin.

To this statement of the case *La Semaine* makes reply that in general an architect is at fault if he omits to supervise the works under his charge with due care; if he allows the building to be erected on a bad or yielding soil; if he permits the use of improper materials; if his plans indicate weak or vicious construction; and if he neglects to require the observance of the public laws and regulations, as well as of any conditions or restrictions concerning which his employer has given him notice. Whether the fact that the cost of the construction exceeded the estimate should be regarded as a fault on the part of the architect depends, says *La Semaine*, upon circumstances. If the architect, unknown to the proprietor and without his authority, should bring him into expense, the latter would naturally refuse to pay the cost of the extra work, and the question of responsibility should then be decided; but as the architect has unquestioned authority to order the execution of extra works asked for by the proprietor or arranged with his consent, the fact of its having been paid for without remonstrance was evidence that the additional work in the present instance was carried out by the architect with at least the assent of his client, and in this case he was entitled to commission on the whole cost. For vicious construction, required by the drawings or permitted by the architect, he was certainly responsible, and both he and the contractor were jointly liable for damage caused by building in the beam under the fireplace; but in regard to the sashes and shutters there might be a question as to their superfluous character, and the twenty-three inch corridors, although unusual, could hardly be classed as constituting a vicious construction, particularly as the proprietor did not notice the inconvenience of them until he had lived in the house for two years.

A plan which has proved successful on a small scale in former years is to be carried out extensively this season in the Paris theatres, where paintings and sculptures are to be exhibited and sold in the anterooms and *foyers*, not only during the hours of the performance, but through a portion of the day. According to the *Architect*, this mode of displaying their works is favored by artists, who thus save a part of the exorbitant commissions charged by the picture-dealers, and the public will certainly welcome such an addition to the pleasures of the theatre. Some well-known painters have already begun to exhibit in this way, and it seems likely that they will find the enterprise a profitable one.

According to the *Architect*, a novel exhibition was to be held last Sunday in Paris by M. Jules Lévy, in which the objects shown, while having some artistic character, were particularly remarkable for their eccentricities of one kind or another. Among them was to be a bust executed by the well-known artist Louis Leloir, with real hair and teeth; a painting by M. Raymond on a patent-leather shoe; a portrait by Langlais of M. Veuillot, painted on a kitchen skimmer, and various other objects. Five hundred articles were described in the catalogue, and the sale of tickets among the idle and curious class was very large.

Another fatal accident from contact with electric-light wires is reported from Paris. On the occasion of a display of fire-works in the garden of the Tuileries a few weeks ago, two men attempted to climb over the iron railing, and in order to help themselves took hold of a wire used for conveying a current for the illumination of the grounds, when both were struck dead. In another case a party of firemen were on their way to a fire with an escape-ladder, which happened to strike an electric-light wire overhead. The current instantly followed the short circuit to the ground, temporarily disabling the men in charge of the apparatus, who received a part of the shock through the metallic handles which they held.

The municipal authorities of the city of Edinburgh, through the influence of the Public Health Committee, have established a regulation which should prove very useful. Under it any citizen who suspects that the plumbing or drainage of his house are not what they should be, has only to notify the city engineer, who will send a competent inspector to examine the whole system of sanitation of the house. This inspector carries his notes to the engineer, who then prepares a report, stating the character of the defects, if any exist, and, what is still better, explaining the proper manner of remedying them. If we are not mistaken, a similar provision is to be found in the health regulations of some towns in this country, but for some reason little advantage seems to be taken of it.

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BUILDING SUPERINTENDENCE.—XXIII.

GAS-FITTING.

[*The gas-fitting is often included in the plumber's contract.*]

Piping. PIPE the house for gas in the best manner in accordance with the regulations of the Gas Company, with outlets as marked on plans, [*seventy-two*] outlets in all. All pipe to be best wrought-iron, and all fittings under 2-inch to be of malleable iron. All to be put together with red lead, capped, tested and proved perfectly tight before any plastering is done, and the caps left on. All pipes are to be laid with a fall towards the meter, which is to be placed [*in furnace-cellar near west window*] and all are to be well secured with hooks and bands.

The gas-fitter is to call upon the carpenter to do such cutting of timbers as he needs, but no beams are to be cut, notched or bored at a greater distance than 2 feet from the bearing; drop-lights where requisite to be supplied by special branches. All nipples to be of the exact length for putting on fixtures without alteration, and all to be exactly perpendicular to the wall or ceiling from which they project. Bracket outlets in all Halls and passages, Parlor, Dining-room, Kitchen, Bath-room, Furnace-cellar and Basement Water-closet, to be exactly 5′ 6″ above finished floor; elsewhere to be exactly 4′ 9″ above finished floor. Mirror light outlets to be 8′ above finished floor.

Connecting Meter. Apply and pay all necessary charges for service-pipe from street main to inside of cellar-wall, and connect the service-pipe and house-pipes with the meter in the best manner, with stop-cock on the street side of the meter, and leave all perfect.

HEATING.

Furnish and set where shown or directed in Basement one best quality [*No. 24 Peerless*] brick furnace, including galvanized-iron inverted cone top and covering bars, 8-inch galvanized-iron smoke-pipe, tin hot-air pipes, register-boxes, registers, soapstone borders, plastering rings, wire nettings and dampers complete, and including also all cartage, transportation and labor of every kind except only mason and carpenter work.

Size of Pipes and Registers.

In First Story: The Front Hall is to have 12-inch pipe and 12″ x 15″ register.
The Back Hall is to have 12-inch pipe and 12″ x 15″ register.
The Parlor is to have 12-inch pipe and 12″ x 15″ register.
The Dining-room is to have 12-inch pipe and 12″ x 15″ register.

In Second Story: The Chamber over Dining-room is to have 10-inch pipe and 10″ x 14″ register.
The Chamber over Parlor is to have 10-inch pipe and 10″ x 14″ register.
The Chamber over Kitchen is to have 9-inch pipe and 9″ x 12″ register.
The Chamber over Hall is to have 9-inch pipe and 9″ x 12″ register.
The Dressing-room is to have 8-inch pipe and 8″ x 10″ register.
The Bath-room is to have 8-inch pipe and 8″ x 10″ register.

Each room is to have an independent hot-air pipe and all hot-air pipes to be double where they pass through floors or partitions, or behind furrings. The pipes are to be carefully arranged so that all may draw equally, with easy turns at every change of direction. All register-boxes are to be double; all tin-work to be of XX bright tin, and all wood-work within 1″ of any hot-air pipe, or within 16″ of the smoke-pipe, to be protected with pieces of bright tin, securely nailed on. All registers are to be of [*Creamer's*] make, all placed where shown on plans or as directed; the one in Parlor to be nickel-plated; all the others to be black japanned.

Cold-Air Box. Make and put up a cold-air box of galvanized-iron as shown by blue lines on plan, to be 22″ x 31″ in section, all riveted together in the best manner, and strongly secured to cellar ceiling. The mouth at each end to be flanged out to protect the joint with the frame, and to have strong galvanized-wire netting, ¼″ mesh, over the opening. Put a sliding damper of galvanized-iron in each end, and make door 24″ x 30″ for cleaning out, with button fastening.

Regulator. Furnish and put on in the best manner [*White's*] automatic regulator, to act both upon the check-draught and the damper in the smoke-pipe, and leave all in perfect working order.

Clean up the iron-work and leave it neat at the completion of the building, and furnish a shaking handle, poker and iron shovel.

Range. Furnish and fit up where shown in Kitchen one No. 5 [*Carpenter's*] Range with water-back and couplings, and plate-warmer, all to be set complete, including all transportation and labor except mason-work. Clean up the range and leave it neat at the completion of the building, and furnish at the same time the usual list of tin and iron ware.

Laundry Stove. Furnish and set up where directed in Laundry a [*Walker's*] No. 1 stationary laundry-stove, with galvanized-iron smoke-pipe and zinc-covered stove-board complete: all to be left neat and perfect.

CONTRACTS.

Not the least important of the young architect's duties is that of guarding the interests of his employer by means of a clear and explicit contract with each of the mechanics employed on his building. In general the architect himself will have to draw up these instruments, the ordinary printed forms being quite inadequate for the purpose, and he will find the task not always an easy one. While it is incumbent on him to secure the best and safest terms for his employer that the contractors will agree to, he has no right to use unfair means to induce them to sign their names to stipulations of which they do not fully understand the meaning; and if he wishes to be able to enforce the contract in case of need he cannot be too careful to express in the plainest language every point upon which it may subsequently be necessary to insist.

In order to provide for all possible contingencies it is necessary to define the rights and duties of the parties under a great variety of circumstances, and a good contract will for this reason be somewhat long; but this is better than a condensation which leaves loopholes for evasion or dispute.

It must not be forgotten that contracts are often entered into unthinkingly, which may prove very disadvantageous for one of the parties, and the architect must be careful to protect his principal from such mishaps. Thus the making of a bid for work by a mechanic, and its unconditional acceptance by the owner, or the architect for him, constitute a valid agreement, by which the mechanic is bound to do the work, and the owner to pay for it, perhaps without any stipulations as to the time of completion, the terms of payment, or other very important matters, which may have to be decided afterwards by costly litigation. For this reason many architects accept a tender only upon the condition that a satisfactory contract shall be signed by the party offering it; but such a conditional acceptance does not bind the latter, who is then at liberty to withdraw his bid, if he chooses, at any time before the final agreement is signed. If, therefore, any tender should be particularly advantageous, it may be desirable to prevent its withdrawal by a prompt and definite acceptance, and in order that this may carry with it by implication the consent of the parties to at least the more important clauses of an ordinary contract, it is usual to employ the device of General Conditions, which are prefixed to every specification and constitute a part of it: and since the tender is always for doing work or furnishing material according to the specification, the general conditions will be included in the terms to which the bidder offers to conform, and will be binding upon him if his bid is accepted. As the general conditions relate to the duties of the mechanic, not to those of the owner, the former will usually be very willing to exchange the one-sided agreement constituted by them, under which for instance, the owner would not be required to make any payments before the completion of the work, for a new one, defining the rights of both parties; and the new contract may, and should, comprise the substance of the general conditions of the specifications, expressed in nearly the same words.

A building contract is usually divided into two portions, the first of which is the simple agreement of one party to do a certain work for the other within a certain time, in consideration of a certain payment, which the latter promises to make; while the second comprises the conditions which explain, or modify the principal agreement. The first portion, comprising the essence of the contract, should be drawn up with special care, and although expressed in the briefest possible terms, it should be made to include the points regarded as most important. In English contracts the principal agreement is generally written without any punctuation except periods at the ends of the sentences, the object of this being as much to enforce clearness of expression as to prevent the possibility of fraudulent or careless change in the sense by the alteration of points, and the practice seems to be a useful one. The conditions which follow may have ordinary punctuation or not, but it is not easy to make them intelligible without it.

Seals. Whether contracts should be sealed by the signers or not is perhaps doubtful. A simple agreement, in which a consideration is expressed for each promise, would not require seals, but among the many and various stipulations of a building contract some might possibly be regarded as promises to which the consideration did not apply, and a seal would be required

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to make these valid: so that it seems to be a reasonable precaution to affix them.

In some states building contracts must be recorded by the proper public officer, and the law in this respect should be ascertained by architects practising beyond the boundaries of their own state. The statutes in regard to the liens of mechanics and material-men also vary in different states, and are frequently changed, so that some care is necessary to secure owners absolutely against loss by the dishonesty or bankruptcy of the builder. In most states the right of mechanics to file liens against a building or estate to recover the amount of their wages for work upon it is barred at the expiration of thirty days from the time that they cease their labor, so that if the record after this time shows no lien to have been filed, the contractor may be paid the balance due him in full, without fear that the workmen can demand an additional sum. Where sixty days or more are allowed by law for filing liens, the last payment to the contractor must be deferred until after the lapse of this term, allowing a few days more to give opportunity for examining the record. Liens for materials furnished to a contractor can in most states only be claimed by giving notice to the owner of the building in which they are used, before they are delivered, that he will be held responsible for the price of them, and he can then retain the amount out of the payments to the contractor, or he can notify the dealer that he will not receive them, and the latter can then only look to the builder for his pay.

With these explanations, the clauses in the following form of contract will be sufficiently clear. The insurance clause may need modification according to circumstances, but the important points are to make sure that the builder's interest will be covered, so that in case of loss he may not be thrown into bankruptcy, to the injury of the owner; and to define clearly the mode in which the policy shall be taken out and paid for, so that the building may not be left unprotected through any misunderstanding between the owner and contractor as to each other's duty.

CONTRACT FOR BUILDING

Made this *fifteenth* day of *September* in the year 1883 by and between *James Johnson* of *Albany* in the County of *Albany* and State of *New York* party of the first part and *Thomas Smith Richard Smith* and *Henry Smith* of *Melrose* in the County of *Rensselaer* and State aforesaid *copartners doing business under the firm name and style of Smith Brothers* builders party of the second part.

The said *Smith Brothers* party of the second part for themselves and each of them and each of their heirs executors administrators and assigns hereby covenant and agree to and with the said party of the first part his heirs and legal representatives in consideration that the party of the first part agrees to perform the consideration hereinafter mentioned to make erect build and finish for the said party of the first part his heirs and assigns a dwelling-house on land of said party of the first part on *Fairfield Street* in said *Melose* including all the *excavation and grading mason-work plastering carpenter-work roofing painting and glazing but exclusive of plumbing gas fitting and heating* and to furnish all the materials of every kind labor scaffolding and cartage for the full completion of the said *excavation and grading mason-work plastering carpenter-work roofing painting and glazing* and they agree to supply said work and materials in strict accordance with the drawings and specifications made by *Edward Tyro* of said *Albany* architect which said drawings and specifications are and are to be taken and deemed to be a part of this contract by both the parties thereto and all things which in the opinion of the said architect may fairly be inferred from such drawings and specifications to be intended without being specially stipulated are to be taken as expressly specified and all the materials are to be supplied in sufficient quantity and where the quality is not otherwise described in the specifications the best quality and workmanship is specifically implied throughout and the said *Smith Brothers* party of the second part covenant to perform the whole of their agreement in the best most substantial and most workmanlike manner subject to the directions from time to time and to the satisfaction of the said architect or his successor appointed by the party of the first part and to deliver their work completely finished on or before the *fifteenth* day of *April* next.

And the said party of the first part hereby promises and agrees in consideration of the promise of the party of the second part to perform the foregoing covenants to pay to the said party of the second part the sum of *six thousand four hundred and ninety-seven dollars* ($6,497) in four several payments as follows:—

The first payment to be *Fifteen Hundred* Dollars ($1,500) when the roof is on and boarded.

The second payment to be *Fifteen Hundred* Dollars ($1,500) when all the outside work including piazza and porch is done and painted one coat and the mason-work and plastering finished and the sashes in.

The third payment to be *Fifteen Hundred* Dollars ($1,500) when the standing finish is done and the upper floors and stairs completed and the second coat of paint on the outside.

And the balance *thirty-three* days after the said work shall have been completely finished and delivered and accepted by the said party of the first part unless some defect shall meanwhile have been discovered in the said work.

Provided however that no payment shall be made except upon the certificate of the said architect or his successor that the work for which said payment is to be made is properly done and that the payment is due such certificate however not exempting the party of the second part from liability to make good any work so certified if it be afterwards discovered to have been improperly done or not in accordance with the plans or specifications and provided further that prior to each payment by the party of the first part a satisfactory certificate shall have been obtained to the effect that the estate or building upon or for which the work is done is at the time when the payment is made free from all mechanic's liens and other claims chargeable upon said building or estate and incurred by said party of the second part.

And it is hereby further agreed by and between the said parties hereto that the drawings and specifications are intended to coöperate so that any works shown on the drawings and not mentioned in the specifications or *vice versa* are to be executed by the party of the second part without extra charge the same as if they were both mentioned in the specifications and shown on the drawings. The said party of the first part or the said architect with the consent of the party of the first part shall be at liberty to order any variations from the drawings or specifications either in adding thereto or diminishing therefrom or otherwise however and such variations shall not vitiate this contract but the difference in cost shall be added to or deducted from the consideration of this contract as the case may be by a fair and reasonable valuation and the architect shall have power to extend the time of completion on account of alterations or additions so ordered such extension to be certified by him to the party of the first part at the time when such order for alterations or additions is given. Orders for changes which do not affect the cost of the work may be given by word of mouth but no order for any change which increases or diminishes the cost of the work or affects the time of completion shall be valid unless given in writing.

Neither the whole nor any portion of this contract shall be assigned or sub-let by the party of the second part without the written consent of the party of the first part.

If the said party of the second part shall fail to complete the said works including all variations should such be made at or before the time agreed upon with such extension if any in the case of extra work as may have been made and certified by the architect then and in that case the said party of the second part shall forfeit and pay to the said party of the first part the sum of *Ten* dollars ($10) for each and every day that the said works shall remain unfinished after the time agreed upon for their completion unless in the opinion of the architect such delay could not with reasonable diligence and prudence have been avoided or foreseen by the said party of the second part the sums so forfeited to be retained as liquidated and ascertained damages out of any money that may then be due or owing or may thereafter become due or owing to the said party of the second part on account of *their* work and materials under this contract.

If the said party of the second part shall become bankrupt or insolvent or assign *their* property for the benefit of creditors or become otherwise unable *themselves* to carry on the work or shall neglect or refuse to do so at any time for six days in the manner required by the architect or shall refuse to follow his direction as to the mode of doing the work or shall neglect or refuse to comply with any of the articles of this agreement then the said party of the first part or his agent shall have the right and is hereby empowered to enter upon and take possession of the premises with the materials and apparatus thereon after giving two days' notice in writing and thereupon all claim of the said party of the second part *their* executors administrators and assigns shall cease and the said party of the first part or his agent may after using such of the materials already on the ground as shall be suitable provide other materials and workmen sufficient to finish the said works and the cost of labor and materials so provided shall be deducted from the amount to be paid under this contract.

All materials shall be the property of the party of the first part as soon as they are delivered on the ground subject only to the right of the party of the second part to remove surplus materials at the completion of the building but no materials are to be paid for before they are set in place in the work.

The said party of the first part shall keep the said building at all times fully insured against loss by fire for the benefit of whom it may concern and in case of loss the indemnity shall be divided between the parties hereto according to their respective interests in

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the property destroyed. The said party of the second part shall be solely responsible for all loss failure or damage from whatever cause to the said works loss by fire alone excepted until the whole is delivered and accepted by the party of the first part and shall give all necessary assistance to the other mechanics employed in the building and shall be solely responsible for any delay to their operations or damage to their work or materials or to neighboring property or to the persons or property of the public by the workmen or through the operations of the said party of the second part.

And for the faithful performance of each and every the articles and agreements hereinbefore contained the said parties hereto do hereby bind themselves their heirs executors administrators and assigns each to the other in the penal sum of *Three Thousand* Dollars ($3,000) firmly by these presents.

In Witness whereof the said parties hereto have hereunto set their hands and seals the day and year first above written.

In presence of

EDWARD TYRO to both. { JAMES JOHNSON, [Seal.] SMITH BROTHERS. [Seal.]

BUILDERS' SCAFFOLDING.—V.

IN the four previous papers which appeared in the March, April, May, and August monthly numbers of the *American Architect*, we have mainly attempted to consider the description of the scaffolding which is usually employed in the United States in the ordinary classes of buildings, and which may for the sake of convenient distinction be called the *scantling* or American type, of which that particular variety which is usually built for bricklaying purposes, Figures 8 and 9, are illustrations. It has been fully described in the first part of the April paper of this series. Figure 9 is a geometrical section of Figure 8. It may be observed with regard to the cross-bracing shown in Figure 9, that unless the upper as well as the lower corresponding braces are both made fast to the opposite ends of the same putlog, the bracing will not be effective unless indeed the putlogs be secured each to a standard which ordinarily is scarcely practicable, and I have seldom observed it to have been attempted in the United States, though in England the putlogs are frequently lashed to the ledgers, which, however, being poles are stiffer laterally than the plank or board ledgers mostly used in America. Other distribution of braces are common, as by fastening a piece of board, fencing, cull, etc., to the window frames and to the standards; but it often happens that the window frames do not come squarely opposite to the standards, which would render this bracing less effective. This method of bracing can only be done below the working stage of the scaffold, which for the time being is in use. Another method is sometimes used though often, it would appear, accidentally in ignorance of its possessing this property to any extent, viz.: by slanting the putlogs obliquely to the face of the wall, or askew, as shown by Figure 10, in which the arrow in the enlarged portion of the figure indicates the normal tendency or direction in which any distorting force would usually be free to act, the longitudinal bracing preventing any lateral movement or motion in any other direction, *i. e.*, an oblique movement outwards from the wall, which would coincide with the axial direction of the putlog when it would be easily withdrawn. When putlogs are thus laid obliquely for the purpose of serving as cross braces, the obliquity of each half of their number should be in opposite directions, so that any tendency to an oblique movement, facilitating the withdrawing of the one-half of the putlogs would be counteracted by the opposing tendencies of those slanted in the opposite direction. Putlogs when thus laid obliquely for the purpose of acting as cross braces, should be wedged around by the brick and mortar so as to prevent their slewing back out of their original position. This sort of bracing can only be to any extent effective when several feet of wall is built above the putlogs, so as to superimpose sufficient weight on them.

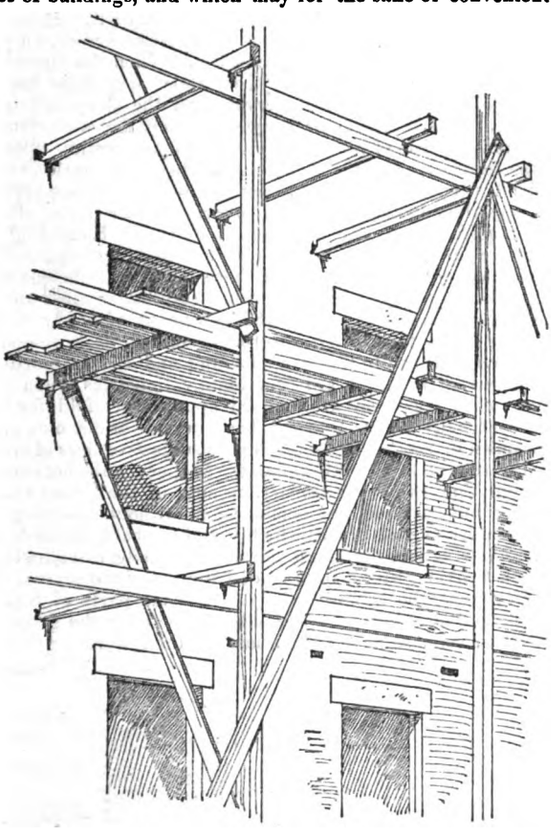

Fig. 8.

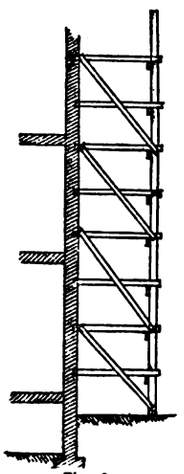

Fig. 9.

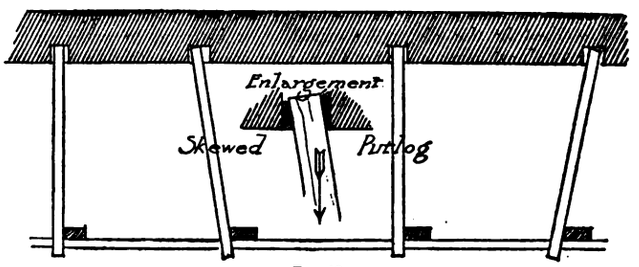

Fig. 10.

In New York, and probably to a less extent in other eastern cities, the *pole*, or English type as we may call it, because of its prevalence in England, is now being pretty generally employed. The essential difference between the *scantling* and the *pole* varieties of scaffolds is simply that which is implied in their distinguishing names and the different methods of fastening which is respectively adopted for each. In the *pole* scaffolds straight fir or larch spars or poles varying in length from 20 to 35 feet, and in thickness at butt from 5 to 8 inches, and at top from 2 to 4 inches are used. These poles are employed respectively for standards, ledgers, and lateral braces, the putlogs being usually of square oak scantling, the cross braces are usually waste boards, culls, etc. There are the single and double-faced varieties of the pole scaffolds similar in principle and purpose to that described for the scantling type in the April paper. The methods of fastening the standards to ledgers and braces are necessarily different in each of the above, as well as in the frame or whole timber scaffolding, which, in the first paper (March number) in the enumeration of the different varieties of builders' scaffolds, we designated as the No. 2 variety, the usual methods of fastening together the different parts or members of the various scaffolds are thus accomplished in the Frame No. 2 type, the fastening is effected by means of iron dogs, bolts, spikes, and solid brackets, etc., whilst in the *scantling* variety of the *ledger* form of scaffold the fastening is mainly effected by means of large nails and spikes; but for pole scaffolds these methods could not be adapted, and therefore lashings of rope, half-inch to three-quarter inch diameter, are employed. When high pole scaffolds are to be built the standards are each formed of double poles lashed together, breaking joints, each higher pole butting down on top of the next lower one, such joints always occurring alternately at the middle of the adjacent pole, the double poles are lashed together at all such butting joints as well as at intermediate points, the lashings being tightened around the poles with wooden wedges. Doubling the poles for standards is most noticeable in London for the ordinary class of three, four, or five story buildings. For higher and more important buildings, as for wholesale purposes, etc., the *frame* scaffold is brought into use. Double-pole standards do not appear to be much resorted to in Paris, where the buildings, generally speaking, being more substantial, larger and longer spars, 10 to 14 inches in diameter at the butt, are more generally used, in which case bolt fastenings are used, the pieces being slightly gained into each other where they cross one another. The methods of lashing the rope differs in Paris from the English, mainly in the lashing of ledgers to standards. In the English lashing a couple of turns of the rope is taken round the standard on the level of the underside of the ledger, then the two parts of the rope are twisted together and brought up around the ledger so as to embrace it, and afterwards around the standard above the level of the ledger and up again around the standard, the last two operations being repeated several times according to the security required of the lashing; the end is finally secured by one or two hitches, then a wedge of wood is driven between the upper turns of the lashing and the standard to tighten it up as may be required. The scaffold builder in making a lashing brings the coils of rope to fit closely around the poles by hammering with a hatchet as it is bent around the poles. The French method is essentially as follows: the rope has a spliced eye at one end, by means of which one turn or loop around the standard is taken several

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inches (say 6 to 10 inches) above top side of ledger, it is then passed down in front of, and under the ledger and then around the standard, then up again around ledger, and then passed around the standard, this being repeated a number of times around the standard, both above and below the ledger, and also around the ledger as often as may be necessary to security; the end is finally fastened by hitches, etc., a wooden wedge is driven between pole and rope to tighten up as described in the English method. In Europe, in addition to the ledgers and braces being lashed to standards, the putlogs or many of them are usually lashed to the ledgers. A screw and chain adjustable arrangement of fastening is also used in Paris, though the writer, during a brief visit observed it in use in the scaffolding of buttone building. In Edinburgh, he observed a similar chain lashing tightened by a screw, used for securing lumber loaded on wagons. When standard poles are set on flag pavement they are usually prevented from slipping, etc., by means of a bottomless barrel which is placed around the lower end of the standard, resting flat on end on the pavement; the barrel is then filled with gravel, sand, earth, cinders, etc., and packed down, which causes an adhesion to pavement, and as the standard is confined by being thus imbedded in the gravel, etc., its liability to slip is thus prevented. Another method is to lay a plank or timber sleeper upon the flagging or pavement, and foot the standards on it, securing them to it with dog-irons or spikes, or by means of cleats nailed to the sleepers around the foot of the standard. In Paris the same is accomplished occasionally by means of brickbats or stone spawls laid in mortar or plaster-of-Paris around foot of standard in a semi-globular shape of about 2 feet diameter.

Where there are projecting pavilions with deep re-entering angles to the façade the continuous line of the scaffold of a façade is awkwardly broken, thereby adding to the complicity and extent of the scaffolding required, and to the labor and expenses of building it; but it provides a better opportunity for transverse bracing. In the scaffolding of buildings on streets where there is much passing, there is usually scant opportunity for cross-bracing, especially in the narrow streets and thoroughfares of the old cities of Europe. The outside tier of standards in such cases is set on the curb. The gutter should of course be always kept free of obstructions, and a temporary footpath, with outside guard-rail is constructed on the inside of such tier, or if all of the sidewalk or pavement is required to be occupied in connection with the building operations the temporary footpath is placed on the outside of the standards, which are made the line of the hoarding: in some cities the hoarding and temporary footpath are extended out to occupy one-third or one-half of the street. Scaffolding in streets includes, expressed or implied, proper provision for protecting passers-by from falling brick, stone, débris, dust, etc., arising from the building operations. In the large cities of America, this protection should be more insisted on than it is. In England and France it is strictly imperative. Most American cities permit builders to occupy with their building materials, mortar-beds, etc., one-third to one-half of the street during building operations. Such liberal licenses are frequently abused by careless or troublesome builders to the great and often needless inconvenience of the public, and while it may be considered desirable in American cities to encourage building improvements, or to avoid what might be deemed restrictive obstacles to the convenient prosecution of building operations, and citizens will usually bear with commendable good temper, very considerable inconvenience for the sake of having the improvements in their midst; yet city authorities should not only have, but impartially enforce the due observance of such equitable regulations as shall curtail as much as possible the necessary inconvenience which is permitted. In London and perhaps still more generally so in Paris, canvas or baize screens are used towards streets on which the façades require carving, sculpture, moulding, etc., to be executed on the building, which both serve to protect passengers from dust, etc., and at the same time to shield workmen from inclement weather. Sometimes the entire building is enclosed and temporarily roofed by boarding with glazed sashes properly distributed to admit light inside, canvas, tarpaulins, etc., the scaffolding being utilized as a frame-work to secure the covering to, so that building operations may be carried on in all weather, and if need be, at night as well as by day, by the aid of the electric light or the oxy-hydrogen lime-light. In London and some of the provincial cities of England tarpaulins are frequently secured to the tops of the scaffold standards and stretched over the top of the entire building as a temporary roof, to exclude rain and snow.

A combination of the *single ledger* scaffolding with *trestles* is sometimes convenient for outside scaffolds, as it minimizes the number of putlog holes in front walls, as well as simplifies the building of the scaffold: it being easier to place a tier of trestles upon plank sleepers laid on putlogs already in place than to put up the additional ledger and putlogs. Sometimes two and even three successive tiers of trestles are thus superimposed between contiguous tiers of ledgers for successive working platforms. It is necessary in such cases that the upper tiers of trestles should be well braced in towards the wall, and that care be taken that the plank sleepers are not liable to spring between bearings, to avoid which the trestles should rest the one directly upon the other. English and French *double ledger* scaffolding is usually erected in the first instance, before the building is begun, to its proposed height and duly braced, and only the putlogs and planking or boarding of successive platforms are afterwards laid in place as required by the progressive rising of the walls of the building. Planks two to three inches thick are generally used in Europe for masonry scaffolds for the working platform, whether for brickwork or stone-work.

In Scotland the "Gabbert" scaffolding and the *Trestle* scaffold are usually employed in combination: the former is generally confined to large buildings for the purpose of raising the materials by means of steam or hand-power cranes set upon the top of the scaffold platform so as to command an extensive range of the walls of the building within the varying radius of the jib. The cranes are set within or without the walls, distributed in such positions, number and sizes as may be deemed most convenient. The scaffold proper is simply a series of strong trestles, of which Figure 11 may be taken as an illustration, standing breast-high and 5 feet or 6 feet long, and for ordinary house-building are made in sets of 3 feet, 5 feet

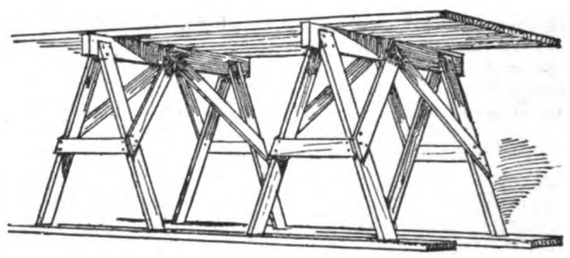

Fig. 11.

and 6 feet high, in order that by combinations they will suit for ordinary heights of stories. The feet of the trestles are set on plank sleepers which are laid upon the floor-joists. When the direction of the sleepers is parallel with the joists, short scantlings are laid across the joists at convenient intervals and the sleepers are laid upon these. The platform or stage on which the workmen and masons stand consists of plank laid close together resting upon the top of the trestles. For the next higher stage the trestles, resting upon plank sleepers laid on the lower tier of trestles, are repeated successively, the one upon top of the other, tier after tier as often as may be required to enable the masons to reach breast-high the height of the story or wall. When trestle scaffolding is adopted for high walls between floor and ceiling there must be sufficient cross-bracing as well as wind-bracing to insure stability against the disturbance of oscillation caused by the movement of heavy weights and tending to overturn or derange the structure. It is seldom advisable, having regard to the heavy loading and the extraordinary strains to which scaffolds are occasionally liable, as when large "baskets" of rubble-stones are dumped upon the scaffold for backing up front walls or for building back or side walls, etc., as is a usual practice in Scotland, to superimpose successive tiers of trestles resting the one upon the other, having sleeper-planks between the tiers higher than five or six trestles, because of the great want of integrity of such a structural combination, without resorting to a system of interties and braces which would probably make it more costly and less satisfactory than the ordinary ledger scaffolding of proper construction, with a suitable distribution of the several parts adapted to resist the strains axially. In some parts of Scotland both inside and outside trestle scaffolds are used for the ground or first story in solid stone walling: masons then work together on

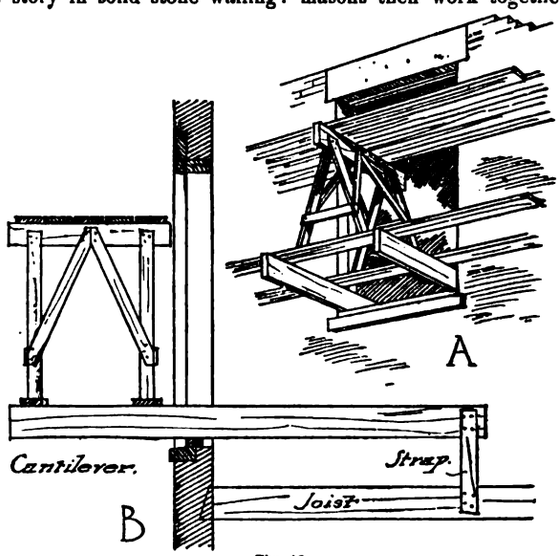

Fig. 12.

both faces of the wall at the same time. Outside scaffolding is seldom otherwise used, except for remodelling or partially rebuilding façades or other outside walls of a building, when it is often of the double-faced *pole* or *scantling* description. When, however, it is required for the purpose of carving, dressing, or cutting mouldings, it is then usually of the cantilever variety, of which Figure 12 is an example, *B* showing it geometrically and *A* in perspective elevation. It consists, as is shown, of two or more beams of timber resting on a

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The Manor-house of Redhouse, Haddenhamshire

View from the South West

Entrance Door South front

Pediment of window

Pediment of door

Jamb of upper windows

String courses

Wall-head course of turret

Other window Jambs

Jamb mold of door

Cornice Jamb of door

Old front from the Saltmarket, Glasgow. date about 1700.

GLASGOW WINE FACTOR

Chimney head cope

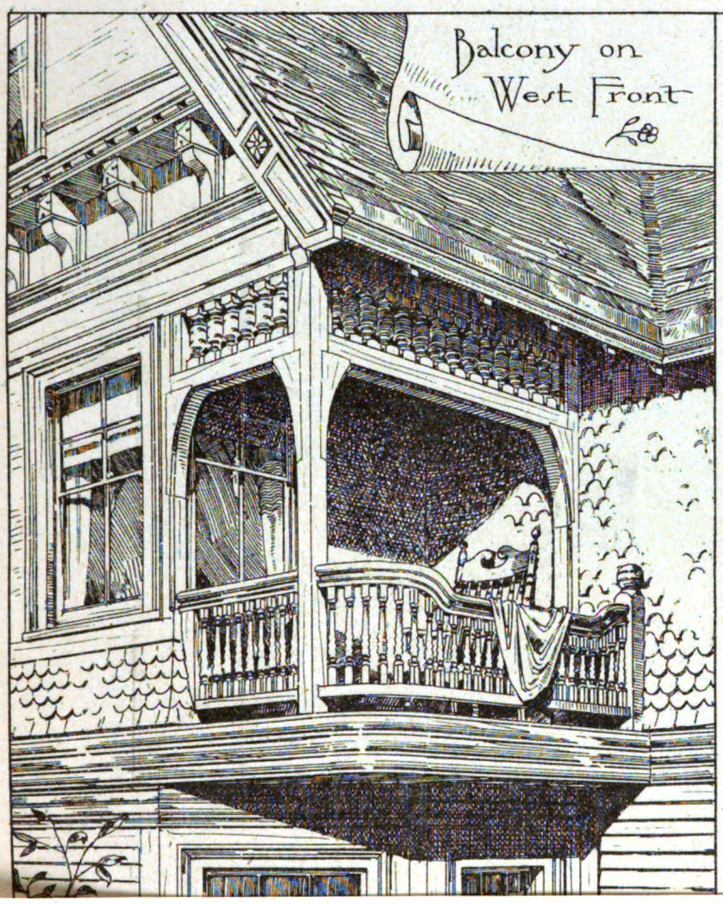
Bottom Arow step

String under windows

Cornice at Wall-head

Window Jambs

Heliotype Printing Co. 211 Tremont St. Boston



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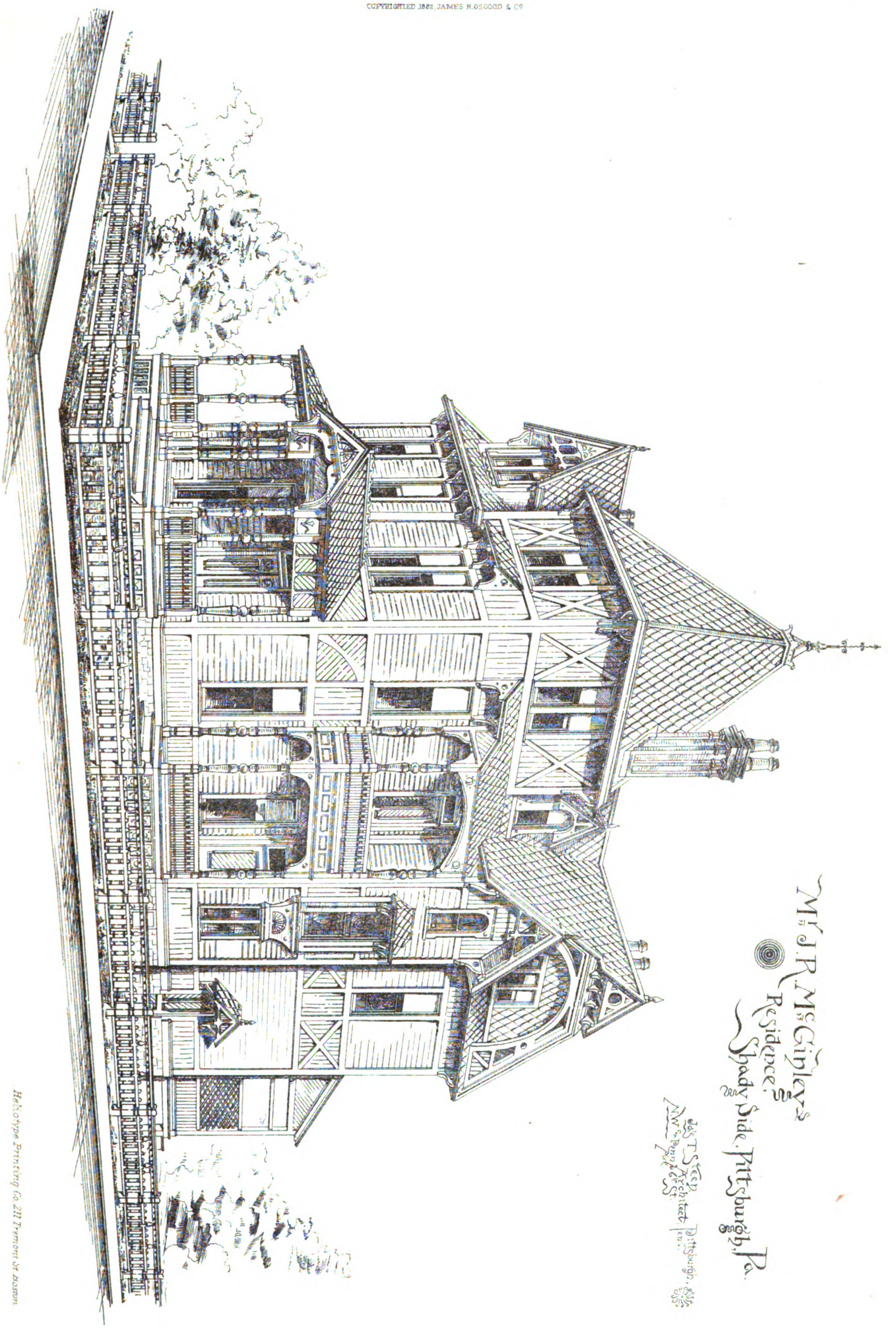

Mr. J. R. McGinley's Residence, Shady Side, Pittsburgh, Pa.

Jos. T. Steep, Architect, Pittsburgh, Pa.

Heliotype Printing Co. 211 Tremont St. Boston.

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window-sill, on which is first laid a piece of plank or board sufficient to distribute the weight and avoid injury to the sill. The inside ends of the beams are strapped down with a piece of board, etc., sufficiently nailed to a joist which is properly secured against lifting by the ends entering the walls.[1]

Across the cantilevers planks are laid to form a platform, if at a convenient height to work from; if the height be not suitable, trestles are set upon planks, and the working platform is then laid upon the trestles. Other tiers of trestles may here be superimposed one above the other as before described, so as to reach breast-high to the next story tier of windows or to the top of the wall, in which case precautionary bracing is necessary as already stated. Whenever trestles are used care should be taken that all four legs should rest firmly on the planks, preferably without requiring to be wedged up, but if trestles become distorted by usage so that wedging is needed they should be nailed in place to avoid getting loose, or being carelessly removed. In ordinary dwellings, shops, or other smaller description of buildings, one or more hand-power cranes are set in convenient positions, usually inside the building, but frequently outside also in front as well as rear, and at a height sufficient to command collectively all the masonry walls so as to hoist the materials up to the wall or upon the trestle scaffold. The "Gabbert" scaffold consists of four upright posts braced together in stages, forming a square or rectangle on plan, and of sufficient extent apart, usually not less than 8 or 10 feet, but more according to the breadth of base required by the height of the structure to insure its stability. Such structures being frequently required to run up 80 or 100 feet high above the basement or cellar floor. The four posts are usually constructed each of (say) three thicknesses of 2″ x 6″ or 2½″ x 7½″ stuff, breaking joint alternately; the transverse pieces on two opposite sides cutting through the intermediate thickness of 2″ x 6″, the cross bracing butting against the inside and outside thicknesses of the posts and spiked thereto on the alternate opposite sides, the transom is spiked or bolted on the inside or outside of the corresponding posts, the cross or panel bracing being inserted between the posts similarly to that above described. Three such structures are disposed at the angles of a right-angled triangular arrangement on plan, and say 20 or 30 feet or longer distance apart, according to size or power of the crane. A frame-work is then laid across the tops of the three structures and fastened firmly together by dog-irons to form a secure combination. On the frame-work are laid three platforms 4 to 6 feet wide, with guard rails to form a connected passage from the one structure to the other, all around the top. When the distance between the three structures renders the connecting frame-work liable to sag it is propped up from the ground by posts or spars set upright in the middle of the span. Diagonal cross bracing is passed between the structures alternately to their tops and bottoms on the three sides of the triangle so as to re-inforce their combined stability. The structure which occupies the right angle of the triangular combination carries a steam crane which is supported directly by an upright log reaching from the ground and running up in the centre of the structure and steadied by raking ground-braces shoring it upon the four sides. A 10 or 12 foot square platform is extended from top triangular platform around foot of crane for the convenience of working it. The raking leg-braces of the crane are passed to the remaining two structures of the combination and secured thereto, and are anchored down by chains passing over the foot of the leg-braces and down vertically to a strong timber frame in the bottom of the two structures on which large piles of stones are loaded. With such an arrangement, and a steam-crane with jib 70 or 80 feet long, with double slewing gear, an extensive range of walls is readily commanded. Such cranes are also multiplied and conveniently disposed over the area of the building according to its requirements.

In the smaller class of houses the cranes, steam or hand power, are supported and guyed at suitable heights by single posts or logs disposed at each of the angle points of a triangle, and all braced together by a system of raking-braces. In most of such cases the connecting platform or staging covers all of the intervening triangular space as well as an extended platform made around the foot of the crane for the purpose of working it. The main platform is supported at intermediate points of the spans between the posts, as well as in the geometrical centre of the included triangle, by auxiliary posts which are braced to the main posts. The extended platform is supported by raking-braces from the supporting post. When logs of sufficient dimensions and stiffness are not conveniently attainable, two logs together braced a foot or two apart support the crane; they are steadied by independent raking ground-braces. This latter staging is not used for heights exceeding 35 or 40 feet from the ground up to the platform. The architect usually makes the employment of the "Gabbert" scaffold imperative in his specifications in such cases as he deems its use necessary to the effective or convenient performance of the building contract.

THE ILLUSTRATIONS.

HOUSE FOR J. R. MCGINLEY, PITTSBURGH, PA. MR. JAMES T. STEEN, ARCHITECT, PITTSBURGH, PA.

A peculiarity of this house is that the roof is covered with glass tiles.

[1] The joists in the position shown in *B* would not be a correct representation for either a front or rear wall, as they are usually laid longitudinally of the building, although in Scotland the joists are ordinarily laid across the building from front to rear.

HOUSE FOR GEORGE D. MOORE, ESQ., ARLINGTON, MASS. MESSRS. RAND & TAYLOR, ARCHITECTS, BOSTON, MASS.

SCOTTISH SKETCHES BY MR. J. W. SMALL, F. S. A. SCOT. — OLD FRONT FROM THE SALT MARKET, GLASGOW; MANOR-HOUSE OF REDHOUSE, HADDINTONSHIRE.

ON THE PROTECTION OF BUILDINGS FROM LIGHTNING. — II.[1]

THERE is much difference of opinion as to whether iron or copper is the better material for lightning-conductors. The French use iron almost exclusively, and Sir W. Thompson prefers it to copper.

For the same money the same conductivity can be purchased in either metal (iron being one-sixth of the price and one-sixth of the conductivity of copper), and iron has the following advantages: —

(*a*) The mass of an iron conductor being greater than that of a copper conductor of equal conductivity, it is heated less by a given current of electricity.

(*b*) The fusing point of iron (2,786° F.) is much higher than that of copper (1,994° F.).

(*c*) Iron is more constant in its conductory power than copper of different samples.

(*d*) A conductor made of iron is not so liable to be stolen as copper, and being so much the stronger is therefore less liable to be broken, accidentally or otherwise.

(*e*) A copper conductor if connected to a cast-iron water-supply pipe (to form an "earth") produces galvanic action, to the damage of the pipe.

On the other hand, a copper conductor lasts longer in smoky towns or near the seashore, where the air rusts iron quickly, and being of much smaller size it does not interfere so much with architectural effects. But Sir W. Thompson has suggested that iron conductors should be treated boldly by architects, and brought into prominence purposely and artistically, and the late Professor Clerk Maxwell recommended that in the case of new buildings the conductors should be built into the walls. They would then not only be hidden but protected from the weather, from the British workman carrying out repairs, and from the thief.

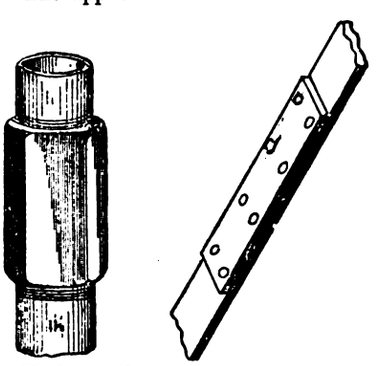
As regards the liability of iron to rust, galvanizing is in most situations a sufficient protection, and in smoky towns an iron conductor should be painted periodically.

On the whole, therefore, the advantages of iron outweigh those of copper so considerably that the employment of copper in lightning-conductors should be the exception instead of the rule. Those who make, supply, and apply lightning-conductors in this country, nevertheless, invariably recommend copper, and it is quite difficult to convince them to the contrary.

Another point I notice is that large conductors are always recommended for lofty buildings, and smaller conductors for smaller buildings, and the same for masts of ships. This is unscientific and wrong. The stroke of lightning falling on a short conductor is no less powerful than the stroke that falls on a lofty conductor; indeed the chances are in favor of the shortest conductors receiving the heaviest strokes, if they are struck at all. On costly and important buildings the proper course to pursue is to increase the number of conductors and of the earth connections, the limit of electrical resistance between any possible striking point and earth being kept below what is fixed upon as the point of safety, viz.: 0.3 ohm per 1,000 yards.

We will now examine the question as to the best *form* of conductor. Mr. Preece has investigated this subject, and by permission of Dr. Warren de la Rue carried out in that gentleman's splendid laboratory a series of experiments on the best sectional form for lightning-conductors. The results were communicated to the British Association at Swansea last year. He found that ribbons, rods and tubes, of the same weight per foot, were equally efficient.

The application of rods and tubes necessitate frequent joints, generally made by means of screw collars. I have found by electrical tests that these joints after long exposure to weather offer very high resistances, especially so in copper conductors. For instance, at Tipner magazine a screwed joint in a large tubular copper conductor tested 10,000 ohms, and a riveted joint in a ribbon conductor on a battery in the Isle of Wight 700 ohms. These joints could not be moved by hand, and were apparently quite tight.



Ribbons of *copper* are now made in long continuous pieces (as much as 70′ or 80′ in one length), and can be applied to irregular architectural outlines, but the joints, although less frequent than with rods and tubes, are open to the same objections. The copper ribbon, however, possesses one decided advantage, viz.: that by the introduction of suitable bends the expansion and contraction from

[1] By Capt. J. T. Bucknill, R. E., from the *Journal of the Royal United Service Institution*." See September Number.

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heat and cold can be allowed for. Iron conductors, when in the form of tubes, rods or ribbons, are difficult to apply, and must possess a number of joints. Moreover, in long conductors, compensators to allow for expansion and contractions by heat and cold have to be introduced. In order, therefore, to obtain with iron the necessary continuity and pliability, it is best to resort to the wire rope, which form is already very generally employed for copper conductors. Pliability can be obtained in several ways: —

1. By using small wires.
2. By making the rope *flat.*
3. By using a hemp core with the round rope.

It is not advisable to make the iron wire ropes with very small wires, because oxidation destroys such a rope rapidly if through carelessness the conductor be left unpainted. A fair amount of pliability can be obtained with a round iron rope 6 lbs. per yard if the wires are about No. 11 B. W. gauge, and arranged in six strands of seven wires each round a hemp core, thus producing a rope about $3\frac{3}{4}''$ in circumference.

But there are few situations in which two ropes of half the size could not be more readily applied, and I think the double rope, if taken up on one side of a tower and down on the other, in one continuous length, has many advantages.

When a single conductor is desired, the best for general purposes is probably a flat iron wire rope about $\frac{1}{2}'' \times 2\frac{1}{4}''$ (11 lbs. per fathom), or $\frac{1}{2}'' \times 2\frac{1}{2}''$ (13 lbs. per fathom.) The round ropes cost from 21*s* to 24*s* a cwt., or about 2*s* 6*d* per fathom for a 12-pound rope, and the flat ropes 33 per cent more, or add one-third.

The next question that presents itself is concerning the terminal point, and a good deal of nonsense has been written about it. Points made of silver or of copper, points covered with platinum or with gold, points of so many millimetres in height and diameter, and possessing certain exact forms, have been proposed, and rejected or adopted as the case may be.

The height of the points above the surrounding roof or tower to be protected has also been much debated with very little profit, for to this day many of the rods erected on the Continent are made much longer than is necessary.

It is a good plan to carry conductors on lofty rods high above powder-mills, flour-mills, and petroleum-oil wells, but these are exceptional cases, the air close to the buildings being frequently charged so as to be dangerously explosive.

The English practice of using a short rod in most situations is a reasonable plan, the rod being placed on the highest part of the building. The rod should be made of the same metal as the conductor, and the connection formed with bolts and afterwards run in with molten zinc or solder. The weight of the rod per foot should be the same as the conductor. The top of each rod should be provided with several points: (*a*) because the gathering power is increased thereby, and the chance of lightning striking other things in the immediate vicinity of the conductor is proportionately diminished; (*b*) because the top of the rod is less likely to be fused when struck, the stroke being divided between the various points; and finally (*c*) because the brush discharge is facilitated.[1]

Another plan is to carry the wire rope up the side of the rod, which in this case might have one point, the wires being opened out to form a brush-like arrangement just under the point. The wire rope and the rod should be bound together with wire and connected with molten zinc.

We must now pass to the foot of the conductor, and here we enter upon the most difficult part of our subject. The earth connections of a lightning-conductor constitute the most important portion of the whole arrangement. If the electrical resistance of the earth connections be high a conductor perfect in all other respects may fail, some alternative and perhaps dangerous route being taken by the lightning discharge. It is difficult to fix the limit of maximum resistance of the earth-connections.

The Académie des Sciences recommends an iron earth-plate, consisting of four arms on a central bar, or five arms in all, each 2′ long and of square section 0.8 inch side, thus presenting a combined surface of 2.6 square feet, to be immersed in water in a well that never dries.

Again Mr. Anderson, in his book referred to says that: —

"When a conductor is taken deep enough into the ground to reach permanent moisture the single rope touching it will be quite sufficient; but when the permanency of the moisture is doubtful it will certainly be advisable to spread out the rope like the fibres in the root of a tree."

Here a few square inches touching permanent moisture is considered sufficient.

Again, Professor Melseus used three earths for the Hôtel de Ville at Brussels: one the gas-main, another the water-main, and the third a cast-iron pipe, nearly 2′ diameter, sunk in a well and giving 100 square feet of surface to the water, which was rendered alkaline with lime to prevent oxidation. The total surface of these three earth-connections amounts to more than two and a half millions of square feet!

As opinions differ so greatly concerning the surface required for the earth-connections it will be necessary before laying down any rule to give some of the reasons upon which it is based.

[1] Sir William Thomson's opinion: "A fork or brush of three or four points at the top of a lightning-rod is probably in general preferable to a single point; but of what practical value this preference may be I cannot tell for certain, although I think it may be considerable."

I must ask you to examine Table (C) of Resistances, which has been compiled from various authorities, and which deals with such enormous differences that it can only be regarded as approximately accurate.

Table C. — *Of Resistances.*

Substance.	Comparative Resistances in Ohms.		Effective Section.
	Copper unity.	Iron unity	
			Sq. in.
Pure copper	1.0	..	..
Commercial Copper	1.17	0.2	0.2
Iron wire	7.0	1.0	1
			Sq. ft.
Carbon	2,500	360	2½
Coke, variable with the sample, about	3,000	400	3
	4,000	600	4
Sat. sol. sulph. zinc	6,000,000	..	..
Salt (sea) water	10,000,000	..	10,000
Approximately, only	15,000,000	..	15,000
Water (spring)	2,800,000,000	..	2,800,000
Water (distilled)	6,754,000,000	..	..
Dry earth (practically)	Infinity.	..	..

We might state the figures against water in this table thus: —

The electrical resistance offered by a cylinder of spring water one yard long is as great as the resistance offered by a cylinder of copper of equal diameter, but seven times longer than the distance of the moon.

The study of this table involves some rather curious considerations. Let us call one square inch of iron its efficient section[2] or conductive capability for carrying off a stroke of lightning. Then the efficient sections of carbon, of water, etc., are as shown in column 4 of table.

Now the practice in the War Department has always been to give joints in conductors a surface of about six times the sectional area of the conductor. This is a very good rule, and is borne out by the French practice, where even with soldered joints 6 square inches of surface is laid down as necessary at each joint in an iron conductor. An obvious corrollary to this rule is that when a conductor is made of two metals (end to end) the joint must have a surface equal to six times the efficient section of that conductor of the two joined which possesses the lowest conductivity. The efficient section of the better conductor ought not in any way to govern the amount of surface of the joint. Thus copper to iron requires a joint of six square inches, the same as would be required by iron to iron. In short the joints should be made of such a size as to prevent the conductors of lower conductivity being damaged by the lightning.

A copper to copper joint only requires one square inch of surface, but it is generally convenient to give more.

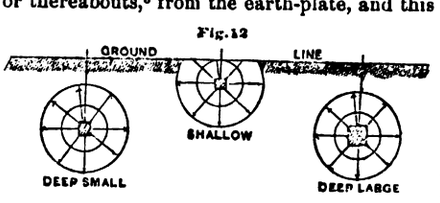
Now, the earth-connection is really a joint — a very difficult joint to make well, and one that should follow the rules of other joints, *unless we can show good reason to the contrary.*

It is found that increasing the size of an earth-plate does not proportionately decrease the electrical resistance. A limit of size is soon arrived at, beyond which it is useless to go. "In the sea this limit is quickly reached." — (Culley.)

Culley states that if a plate containing one square foot of surface gives a resistance of 174 ohms, a plate of 4 square feet will give 140 ohms, and so on, a reduction of only 20 per cent in resistance being obtained by quadrupling the earth-plate surface.

The explanation that suggests itself as probable is that the electric current is distributed through the humid ground by an ever-increasing sectional area (often by a hemispherical surface), thus arriving at the efficient section for a water-conductor of two millions of square feet (*see* Table C), at the small distance of 200 yards or thereabouts,[3] from the earth-plate, and this is borne out by the fact, noted by Culley, that the resistance depends to a certain extent upon the depth at which the plate is buried. Thus, a deep plate would disperse its charge in all directions by an ever-increasing spherical surface up to the limit of a sphere whose radius is equal to the depth of the plate underground, and afterwards by a segment of an ever-increasing sphere, which segment would always in this case be larger than, but would gradually approximate, the atmosphere. These actions are roughly shown on Figure 12.

Fig. 12



Culley states that the resistance alters with the depth at which the earth-plate is buried as follows: —

4	inches	100 ohms.
10	"	90 "
40	"	80 "
80	"	77 "

It would appear, therefore, that little is to be gained by increasing the surface of junction between the earth-plate and the earth: (1) beyond the amount required to insure that the resistance to

[2] This has already been shown to be rather less than a square inch of solid iron.

[3] In an arid plain with a dry subsoil, the surface of which was wet by rain only to the depth of one inch, the efficient section of water-conductor would not be reached at a less distance than fifty miles.

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earth at foot of conductor is less than the resistance to earth through possible alternative routes in the vicinity of the conductor, and (2) beyond the amount required to prevent damage to the conductor by the flash of lightning when it leaves for earth. It is evidently impracticable to give a surface of some millions of square feet to the earth-connections, and if it were practicable the foregoing considerations prove, I think, that it is not necessary to do so.

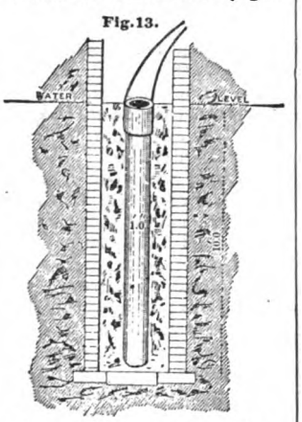
The difference in the conductivity of iron and water is so enormous that an intermediary appears to be very desirable. Carbon is eminently suited to act in this manner, especially if used in the cheap form of coke and ashes. The minimum effective section for coke is about 4 square feet; the iron which is surrounded by coke should therefore have a surface of 24 square feet. Moreover, inasmuch as the contact between an iron plate, of whatever form, and coke loosely surrounding it must frequently be discontinuous, and as the conductivity of coke in a mass composed of loose particles must be very much lower than that of a solid piece, the above surface should in practice be a minimum. The total surface may, however, be divided if a number of earths be used.

The outer surface which should be given to the coke must depend very much upon the nature of the ground; when the conductor is led into soil which cannot be regarded as permanently damp the surface of the carbon "earths" must be increased.

As the surface of the earth-connections should vary directly as the resistance per unit of area, an intermediary of coke becomes unnecessary where a conductor is led into salt water: but the conductor should still present a total surface to earth of from 20 to 30 square feet, the amount being divided between the "earths" if several conductors be connected.

Professor Pouillet's committee, which reported upon the application of conductors to the Louvre in 1854–55 (the said report being adopted by the *Académie des Sciences*), recommended that when permanent water is not found near the surface two descriptions of "earth" are necessary; first, the deep earth-connections to permanent water, and secondly, the shallow earth-connection to the surface-water. This for the following reasons: after a long drought the "terminating plane of action" (to use Sir William Snow Harris's term) is situated on the upper surface of the deep water-bearing strata, the induced charge being consequently collected there. After a heavy rain, however, which thoroughly impregnates the upper strata with water, the "terminating plane of action" is raised to the surface of the ground and the induced charge is accordingly collected there. It is evident, therefore, that a perfect arrangement should in many situations provide both for *surface earths* and for *deep earths*. In some situations, however, such as the top of a chalk hill, deep earths would be of little value; whereas in other situations surface earths would be inefficient — in a well-paved town, for instance, where the surface-water is at once carried off by gutters and drains.

Fig. 13.



A deep earth-connection can be effected in the manner shown in Figure 13, the well being carried down 10′ below water-level in the driest seasons. The diameter of the well may be fixed at 3′. It should be rendered alkaline with lime, so as to protect the iron from rust.

The bottom 10′ should have no mortar or cement in the walls, and should be filled in with blocks of coke. The iron conductors should terminate in cast-iron pipes, offering together 24 square feet of outside surface. The pipe should be galvanized to preserve it from oxidation. The dimensions of the pipe may be, length 10′, diameter, 1′. The pipe may rest on the bottom of the well in a vertical position. The best way to connect the pipe with the conductor is to have a flange at the top (all ordinary gas or water pipes have such flanges), and to rivet a small cylinder to the inside of the pipe at the upper end, thus forming a ring or annulus into which the end of the conductor can be introduced and the space filled in with molten zinc, the surfaces of the conductor and of the pipe having first been cleaned and painted with hydrochloric acid.

In situations where iron water-supply pipes are at hand they can be employed in place of the deep earth-connections already described, but great care must be devoted to the connections. The conductor must be laid along the iron pipe for a distance of 4′ (if an iron wire rope it should be unlaid for this distance); it must then be bound to the pipe with wire and a metallic connection formed by means of lead, zinc or solder. The connection should then be tarred and covered with tarred tape to prevent galvanic action.

Surface "earths" should consist of a trench filled with coke and ashes, and carried away from the walls. Clay and other soils which keep the rain-water near to the surface require shallow trenches about 1′ deep; whereas gravel, sand, or shingle, through which the water penetrates easily, require deeper trenches, say 2′ deep. In each case, however, the top surface should be kept on the ground-level.

The end of the metal conductor should be carried along the bottom and through the whole length of each trench. This length may in ordinary soils be fixed at 25′, and in very porous soils at 50′.

The water-pipes from the roof of the magazine or building may with advantage be caused to deliver into gutters which lead to the surface "earth" trenches.

The shallow trenches 1′ deep, recommended for stiff soils, may conveniently be split into a V-shape on plan (the conductor being split also), so that the total side of surface may be equal to that given by the same length of deeper trench used with porous soils.

Important buildings and magazines provided with several conductors may have a few deep "earths" and several shallow "earths," an "earth" of one or the other description being provided at the foot of each vertical conductor, and in order to connect the whole it is advisable to employ a horizontal conductor near the foot of the wall, but above ground, in order that it may be open to inspection, such conductor being carefully connected to all the vertical conductors, and to all the metal water-pipes. By this means not only is the cage principle advocated by the late Professor Clerk Maxwell and other physicists embodied, but the earth-connections are connected in an efficient and reliable manner.

Sir W. Thompson considers that conductors on magazines should be spaced at intervals of about 50′, by which plan no portion of the building would be more than 25′ from a conductor. This rule has been adopted by the War Department for all large magazines, and a conductor of power equal to an iron rod weighing 8 lbs. per yard has been adopted for single conductors, and of half that weight for all others. A wire rope of 4 lbs. per yard applied *as shown in diagram*, is now considered the best arrangement.

It will be seen that wherever the lightning falls a conductivity equal to, or more than, that of a single large conductor, will carry the stroke off to earth.

Small magazines can be protected by one rope led to a deep "earth" at one end and to a shallow "earth" on the other as shown on diagram.

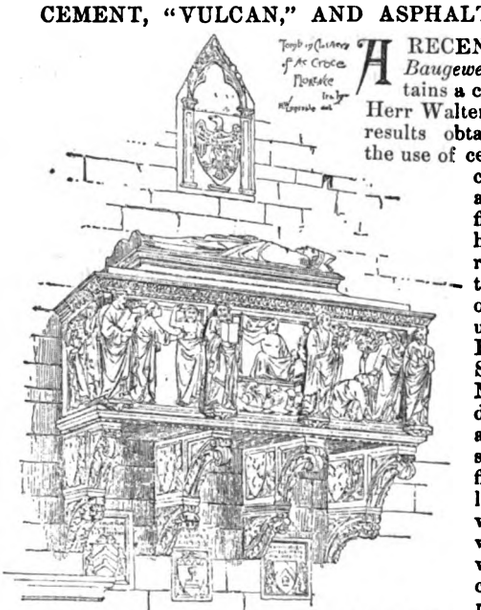
Powder-mills must be provided with lofty conductors to guard as much as possible against powder-dust in the air being ignited by the stroke.

As regards the inspection of lightning-conductors opinions vary greatly, and it was mainly in order to obtain a report on this matter that I was ordered last summer to inspect a number of conductors on magazines in the Portsmouth district.

Before concluding this paper I may observe that the principal object has been to prove the following points: —

1. That iron is the best metal to use in conductors.
2. That wire ropes are more easily applied than rods, ribbons, tubes, etc.
3. That conductors should be continuous, and that all unavoidable joints should be soldered.
4. That conductors should be specified in terms of electrical units.
5. That lofty conductors require no additional conductivity per unit of length.
6. That high lightning-rods are only required in exceptional situations.
7. That several points are preferable to a single point.
8. That greater surface than is usual with present practice should be given to earth-connections.
9. That both deep and shallow earths are required.
10. That periodical inspection is most important.
11. That the history of conductors and of former tests should be carefully recorded.
12. That electrical tests may then be of value.

CEMENT, "VULCAN," AND ASPHALT FLOORS.



A RECENT issue of the *Baugewerkszeitung* contains a communication by Herr Walter Lange on some results obtained by him in the use of cement, a material called "Vulcan," and asphalt for floors in wet and highly-heated rooms. In the extensive rebuilding of the starch manufactory of Herr E. Hoffmann at Salzuflen (near Minden), burnt down some time ago, about 30,000 square yards of flooring had to be laid down. The various uses to which these floors would be put necessitated the employment of various materials. If to this fact it be added that a portion of the floors had to be taken into use as soon as ever practicable, it may

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well be believed that it was not a very easy matter to make a selection at once as to the proper material to be employed. Experiments had on former occasions been made with different materials, all of which had been unsuccessful. It was especially found that the wear and tear of the floors in the starch factory was very great, owing to the employment of three-wheeled trollies (on the average loaded with 20 cwt. to 30 cwt.), the rapid deterioration of the floors being further accelerated by the fact that they are generally in a very wet or highly heated state.

It was at first intended to use a layer of cement on a concrete bottom for all the rooms (stone slabs could not be employed for the greater part of the rooms on account of the joints), and this was partly laid down when it was found that it would not answer. As above stated, sufficient time had not been allowed for hardening, and then the floors were used at once to such an extent that the cement was broken up in an incredibly short time by the three-wheeled trollies. The front wheel in turning leans over on one side and cuts the upper skin of the cement, and if this were once effected there was no chance of saving the rest, for the lower layer had not yet attained that hardness which would resist pressure. Water on the cut and bruised surface completed the destruction, for, being forced onto the floors at high pressure, even pebbles in the floor were washed out.

Two methods were employed at Salzuflen for laying down cement floors: Upon a fresh bed of concrete a layer consisting of cement and sand in equal parts, and from 2 to 3 centimetres thick, was put, well rammed down, levelled, and then smoothed with a hand iron. This proceeding, compared with the other, has several disadvantages. The second method consists of mixing a concrete of one part of cement, two parts of sand, and four parts of gravel, laying it down, and ramming it until a layer from 1 to 2 centimetres thick appears on the surface without any gravel. This layer is then levelled and smoothed down. Floors prepared by the latter method are much more durable and resist pressure much better than those laid down by the former. The thickness of the concrete floors depends very much upon the extent to which they will be used and the resistance of the soil to be covered. If sufficient time is left for the cement floor to harden — and the longer it is left the better — it will resist for a very long time any ordinary pressure.

In the drying-rooms of the above starch manufactory, cement floors were also laid down; but they proved efficient only after having been put down in first-rate style, and left to bind and harden for a sufficient length of time (from four to six weeks). But should they be intended to be used before that time, and subjected early to a high temperature (about 40° C.), it is highly advisable to desist from using cement. In the latter case, a kind of floor is to be recommended which is at present very little known, and is described by the inventor, Herr Oelzner, Ingenieur, of Hagen, Westphalia, as "Vulcan" floor. The mass is poured upon prepared beds to a thickness of four centimetres to six centimetres, and costs from three marks to three-and-a-half marks per square metre (about eight cents a square foot). The "Vulcan" floors are prepared in the following manner: The surface is covered with stone chips, ashes, etc., the height of this bed depending upon their later use. The mass, the composition of which is Herr Oelzner's secret, is made liquid, and poured upon the bed. The liquid mass penetrates the cracks and pores of the rubble, and forms, after solidifying, a hard slab. After having somewhat settled, the mass is beaten with a wooden pestle, and smoothed. This operation is repeated as long as the floor sweats after each beating. The floor is smoothed down after each beating. Amongst the advantages claimed for the "Vulcan" floor is its great solidity, which it assumes, however, only after some time. But the hardening of the floor takes place even at a great heat (in the drying-rooms at Salzuflen, hardening is effected at a continuous temperature of 50° C.). Finally, it must be noted that the floor is proof even against strong acids. Experiments have been made by Herr Lange in which the mass in a powdered state was submitted to the action of concentrated sulphuric acid, the only effect of which treatment was that the mass dissolved and then hardened. Herr Lange likewise observed that old pieces of this floor, after having been immersed for some time in concentrated soda lye, remained perfectly intact. The only drawback is that hardening takes place so very slowly. On the other hand the mass becomes so hard as even to blunt steel chisels very rapidly. Herr Oelzner's "Vulcan" floors have been very successful elsewhere, even in establishments where very heavy iron castings or forgings are moved over them. Herr Lange says respecting the composition of Oelzner's "Vulcan" mass it appears to him that it contains a large proportion of blast-furnace slag, and that residuums of sulphuric acid manufacture and the so-called *caput mortuum* (colcothar) are also used in it.

For such rooms as were already in use it was found necessary to resort to asphalt. The asphalt, from the Limmer pits, was the so-called "casting asphalt" (*asphalte coulé*). It was melted in the usual way, mixed with gravel, laid on, and smoothed down with wooden spaddles. Concrete of cement, sand, and gravel served as a bed. In some rooms cement and asphalt layers were used together, asphalt being put down in the passages, concrete in the less used parts; a very sharp edge being indispensable for the joints. Of course, asphalt was used in rooms with wet floors; but it is not suitable in rooms where acids are used, because asphalt peels off in course of time under the influence of acids.

It may be finally added that in Hoffmann's starch manufactory several tanks had to be constructed for the reception of acids, the selection of the inner coating causing some difficulties. Cement, if exposed to the direct action of acids, is at once destroyed; asphalt shares the same fate, although not quite so rapidly. It was, therefore, proposed to employ a plaster of cement with a coating of zeïdeïolithe, a material consisting of nearly equal parts of sulphur and powdered glass and a trifling addition of graphite. This composition is absolutely acid-proof, but inflammable. Its preparation, moreover, and the laying on, caused so many difficulties that the use of zeïdeïolithe was given up at the last hour. It was determined to employ stone slabs, filling up the joints with sulphur, a treatment or procedure which has been found efficient in sulphuric acid manufactories. Of course, it is understood that the stone slabs used must be acid-proof, and have been tested in that direction.

THE TENTH CINCINNATI INDUSTRIAL EXHIBITION.

The Tenth Cincinnati Industrial Exposition which is now about the middle of its prosperous existence, has much in it to interest and instruct the architect and builder.

This is the first time in the history of Cincinnati that any attempt whatever has been made towards an architectural exhibition, and the display is not without interest, and argues well for what can be done in the future by a little more push and concerted action on the part of managers and exhibitors. All the architects of the city, with three exceptions, have three or more drawings on exhibition, the most important ones being a pen-and-ink perspective sketch by Mr. J. W. McLaughlin, of the new Art Museum building, as it will be in some future generation finished in all its parts, and if it is so completed according to the plans, it will probably be the first case of the kind on record.

The other drawing we refer to is a fine perspective of the "Ortiz," the largest French-flat hotel in the city, made as much Queen Anne as moulded and pressed bricks, and stone, and gables, and tower, and things can make it. This building is now receiving the finishing touches (it is nearly two years since it was started), and was designed by Mr. Hannaford, and is a very creditable building. The plans have never been published in any way. We hope to see both of these perspectives, together with their plans, published in the *American Architect* soon.

There is as much else in the Exhibition of interest, but there is not space to mention all, and it would be unjust to discriminate; suffice it to say that the E. Dalbro Company have a magnificent display of hard-wood, there being over fifty different varieties coming from all parts of the world.

POWDER-POST.

Washington, D. C., September 27, 1882.

To the Editors of the American Architect: —

Dear Sirs, — The timber of the worm-eaten church at Andover, Mass., page 142, *American Architect*, is suffering from a disease well known to the manufacturers of shovels and pick-axes, and called by them "Powder Post."

A worm eats the ashen handles, which show minute holes, and when jarred by striking a hard substance gives out a shower of fine powder, "Powder Post." It is so common that they do not attempt to keep long any stock of handled spades, shovels or picks, and I was advised by the late Mr. Oakes Ames, at the close of the war, to sell off at auction the large stock of such stores left in the army depots, as it would be impossible to save the handles from destruction.

Saturation with petroleum was tried, and I think gave protection and prevented progress of the disease.

Dog-wood in the turners' shops is peculiarly subject to being eaten and converted into powder, though I think that the worm-holes in dog-wood are larger than in ash suffering from "Powder Post."

Perhaps petroleum applied in abundance by a sponge or brush might arrest the destruction threatened to the Andover Church.

Very respectfully, your obedient servant,

M. C. Meigs, Bvt.-Maj.-Gen., U. S. A., Ret'd.

BOOKS.

Detroit, September 25, 1882.

To the Editors of the American Architect: —

Sirs, — Please state the best work on Strains in Structures, Heating and Ventilation, also the best work on Graphic Statics.

Yours, etc., Student.

[Rankine's *Applied Mechanics*. Moseley's *Mechanics of Engineering and Architecture*, or Peclet, *Traité de la Chaleur*, Box on *Heat*, Baldwin's *Practical Treatise on Steam Heating*, and the articles in Buck's *Cyclopædia of Hygiene*. Greene's *Graphical Analysis*, Parts I, II and III. — Eds. American Architect.]

OUR BUILDING REPORTS.

Trenton, N. J., September, 25, 1882.

To the Editors of the American Architect: —

Gentlemen, — Will you kindly permit us to find a little fault with your "summary for the week" department. If your correspondents would give the post-office address of the owners and architects, as is partially done in your New York reports it would add greatly to the value of your more than excellent journal to us, and we presume to many other subscribers. Your friends,

Dibble Manufacturing Co.

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[WE hope that our correspondents and reporters will give due heed to this suggestion, but we cannot hope that much greater exactness in the matter of our reports can be effected. We habitually publish the fullest information we can obtain, and the fact that we use the lists ourselves for distributing specimen copies of our journal gives us the opportunity of gauging the exactness of the information we publish: not more than one per cent of the copies we send out being returned by the postal authorities as "undeliverable" through deficiency of address. A large part of the trouble of which our correspondents complain arises from the fact that the different building bureaus throughout the country keep their records in very dissimilar and imperfect ways. Many officials record only the owner, others the builder and owner, some few the architects, and some only the building and its location. These last are useless to ourselves and our subscribers, and consequently we do not report those cities. Very few record with the very desirable fulness of the New York Building Bureau. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

A BIG tree recently felled in California showed 4,860 annual rings of growth.

THE CASTLE OF HEIDELBERG. — The Union of German Architects and Engineers has issued an appeal to the German people to aid in a partial restoration of the Schloss of Heidelberg.

FOSSIL CORAL AS A BUILDING STONE. — From Sydney is reported the discovery of a new building material at Suva, on one of the Fiji Islands. It is known as fossil coral, and when cut from a mass is soft, but on exposure to the air it looks and is very much like brick. During the short time it has been known it has satisfactorily stood the tests that have been applied to it. Orders have already been received for quantities of it to be used in building.

WELLS IN THE SAHARA. — A large number of wells have been sunk along the northern border of the Desert of Sahara,—more than one hundred and fifty in the province of Constantine alone, and the work is advancing into the interior. One of the curious phenomena which the digging of these wells has brought to notice is the existence of fish and crabs at great depths. The engineer, M. Jus, who for twenty years has directed the work, avers that he once boiled and ate a crab which had been drawn up from a depth of 250′, and that, moreover, it was of an excellent flavor.

THE STINGING TREE. — The "stinging tree" of Queensland is a luxurious shrub, pleasing to the eye but dangerous to the touch. It grows from two or three inches to ten or fifteen feet in height, and emits a disagreeable odor. Says a traveller: "Sometimes while shooting turkeys in the scrub, I have entirely forgotten the stinging tree till I was warned of its close proximity by its smell, and have often found myself in a little forest of them. I was only once stung, and that very lightly. Its effects are curious; it leaves no mark, but the pain is maddening, and for months afterward the part when touched is tender in rainy weather or when it gets wet in washing, etc. I have seen a man who treats ordinary pain lightly roll on the ground in agony after being stung, and I have known a horse so completely mad after getting into a grove of the trees that he rushed open-mouthed at every one who approached him, and had to be shot. Dogs, when stung, will rush about whining piteously, biting pieces from the affected part." — *Youth's Companion.*

PAINTING ON SILK. — Some years ago an artist of Florence employed a method of painting on silk and other fine fabrics, in such a way that the surfaces of the colors were not damaged when folded or rubbed. His paintings, even when subjected to tests far more severe than such crumpling as ordinary wear would produce, are said to retain their appearance unchanged, the colors remaining as bright and the surface as smooth as when first laid on by the brush. The method is now no longer the complete secret it was, as the medium is at present manufactured for amateurs, though protected by patent. An example, consisting of groups of flowers, painted on blue satin, by this Adolfi process, shown by Mr. Emil Dünki, has been subjected to hard rubbing, without there being any appearance of injury to the painting. Some Italian artists have tried the medium for oil-painting on canvas. — *Journal of the Society of Arts.*

THE ST. CLOUD CRYSTAL PALACE. — A committee of the French Chamber of Deputies has recently reported favorably on the construction of a Crystal Palace in the park of St. Cloud, a project which was approved in principle in 1881 by M. Sadi Carnot, Minister of Public Works. The building is proposed to occupy the highest part of that portion of the park conceded for the purpose, and its principal entrance would be opposite the avenue descending to the château. It is intended that the buildings should occupy 17½ acres. The palace is to be rectangular in plan, with five naves and a façade facing towards Paris. The dimensions would be — 1,640′ long, 459′ wide, and 164′ high. In the centre would be a dome 328′ high. The other buildings in the space reserved would be as follows: 1. The Palace of the Republic, reserved to the President of the Republic, to ministers, members of the two Chambers, etc. 2. A press building for French and foreign journalists. 3. Panoramas constructed and arranged on a new system. 4. A cosmopolitan theatre, for scenic exhibition of classic and modern drama. 5. A large amphitheatre, for children, gymnastics, etc. 6. A buffet restaurant. 7. A model farm, with land for experimental purposes. 8. Greenhouses, rustic buildings, kiosks, etc., erected either by the Administration of the undertaking, or by exhibitors. It is proposed to utilize the façade of the Belgian Section, which was so striking a feature in the Paris Exhibition of 1878, as well as portions of the Palace of the Tuileries and other monuments in the new scheme. It is intended to connect with this undertaking a project of popular instruction, scientific, artistic, and industrial, and the building would, of course, lend itself admirably to any special exhibition held from time to time. — *Engineering.*

THE CIRCULATION OF UNDERGROUND WATERS. — In the Geological Section of the British Association meeting at Southampton, Mr. C. E. De Rance read the report of a committee appointed for the purpose of investigating the circulation of the underground waters in the permeable formations of England, and the quality and quantity of the water supplied to various towns and districts from those formations, to which was added an appendix, written by Mr. Edward Wethered, on the density and porosity of rocks in relation to the water-supply, in which the author set out by averring that a knowledge of the porosity of rocks was important as regarded the water-supply, the suitability of stone for building purposes, and in accounting for some of the lithological changes often observed in the earth's strata. Though the matter had not escaped investigation, the vast volume of water stored in the rocks had not been fully realized. The density of the old red sandstone was 2.61, the volume of water absorbed by a cubic foot being over 0.707 gallon, and by a square mile, three feet thick, 59,000,000 gallons. The conglomerate beds of the same formation were still more absorbent, being capable of taking in 0.805 per cubic foot, or 67,000,000 gallons to a square mile, three feet thick. The mill-stone grit which lay at the base of the coal measures varied much in different localities, that found in the Forest of Dean being the most porous, absorbing 66,000,000 gallons to the square mile, three feet thick. Some of the coal-measure grits also stored large volumes of water. The Pennant rock, about nine hundred feet thick, in the Bristol coal-field, and extensively developed in Somersetshire, as also around Swansea, was capable of absorbing 12,000,000 gallons in a square mile, three feet thick; and specimens of magnesian limestone, taken from the neighborhood of Bristol, showed a porosity of 86,000,000 gallons; but the carboniferous limestone was quite the reverse, and only absorbed 3,500,000 gallons. Oolites held vast stores of water, and the rock was much used for building. Mr. Wethered then referred to the relation of specific gravity to porosity, and proceeded to say that shallow well-water had been classed by the Rivers Pollution Commissioners as dangerous, and the deep as wholesome, and there must, therefore, be a purifying process going on during the percolation into the earth. From an analysis of rocks, it was clear that nothing in the chemical composition of the rock could purify the water, and in order to get rid of organic contamination there must be oxidation, and they must, therefore, look to another source for the oxidizing agent, which, he thought, existed in the air absorbed by the water, and in the air contained in the interstices of the rock.

POMPEII'S NEW PAINTING. — An important painting has been found at Pompeii and was yesterday placed in the Naples Museum among the Pompeiian frescos. It represents the judgment of Solomon and is the first picture on a sacred subject, the first fragment either of Judaism or Christianity that has been discovered in the buried cities. I have therefore studied it carefully this morning, and forward you a description of it, as I think the discovery of such a painting is a matter of public interest. The picture is 15′ 6″ long and 19″ in height, and is surrounded by a black line about an inch in width. The scene is laid upon a terrace in front of a house adorned with creeping plants and shaded with a white awning. On a dais (represented as being about 4′ high) sits the king, holding a sceptre and robed in white. On each side of him sits a councillor, and behind them six soldiers under arms. The king is represented as leaning over the front of the dais toward a woman in a green robe who kneels before him with disheveled hair and outstretched hands. In the centre of the court is a three-legged table, like a butcher's block, upon which lies an infant, who is held in a recumbent position, in spite of his struggles, by a woman wearing a turban. A soldier in armor, and wearing a helmet with a long red plume, holds the legs of the infant and is about to cleave it in two with his falchion. A group of spectators completes the picture, which contains in all nineteen figures. The drawing is poor, but the colors are particularly bright and the preservation is excellent. As a work of art it is below the average Pompeiian standard, but it is full of spirit and drawn with great freedom. The bodies of the figures are dwarfed and their heads (out of all proportion) large, which gives color to the assertion that it was intended for a caricature directed against the Jews and their religion. This may be so, but my own impression is that the artist was anxious to develop the facial expression, and to do this exaggerated the heads. There is nothing of the caricature about it in other respects: the agony of the kneeling mother, the attention of the listening king, and the triumph of the second woman, who gloats over the division of the child, are all manifest, and to my mind there is no attempt intentionally to burlesque the incident, but this is a matter of opinion. — *Correspondence of the London Times.*

THE DIVERSIONS OF LEONARDO DA VINCI. — Stories like that of the automaton lion, which walked forward to the French King and opened its breast, discovered to be full of lilies, are no more than the feats daily performed by Messrs. Maskelyne & Cook. Again, when Leonardo da Vinci constructed certain figures of animals for Leo X, which flew through the air, he was merely catering for the amusement of a learned trifler, whose "philosophical inquiry," as Vasari calls it, did not rise above a weak dabbling in alchemy. True, some of these experiments have a half-humorous, half-subtle meaning, affording a pleasant glimpse of one aspect of Leonardo's character, — as, for instance, when he once caused the intestines of a sheep to be cleansed and scraped until they were brought into such a state of tenuity that they could be held within the hollow of the hand; then placing in an adjoining chamber a pair of blacksmith's bellows, made fast to one end of the intestines, he would blow into them until he caused them to fill the whole room, which was a very large one, insomuch that whoever might be therein was compelled to take refuge in a corner. He thus showed them transparent and full of wind, remarking that, whereas they had previously been contained within a small compass, they were now filling all space, and this, he would say, was a fit emblem of talent or genius. Vasari goes on to state, "he made numbers of these follies in various kinds, occupied himself much with mirrors and optical instruments, and made the most singular experiments in seeking oils for painting, and varnishes to preserve the work when executed." — *London Times.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

264,852. Hinge for Awning-Blinds. — F. Barton Brown, Boston, Mass.

264,853. Shutter-Fastener. — F. Barton Brown, Boston, Mass.

264,859. Atmospheric Hammer.—John C. Butterfield, Chicago, Ill.

264,861. Machine for Mixing Mortar or Concrete.—Henry W. Caldwell, Chicago, Ill.

264,863. Blower for Fire-Places.—Benjamin G. Covington, Fort Mill, S. C.

264,868. Carpenter's Vise.—Amos Fales, Denver, Col.

264,873. Shutter-Bower. — Stiles Frost, Boston, Mass.

264,875. Pug-Mill. —Alfred Hall, Perth Amboy, N. J.

264,884. Door-Bell.—James J. Johnston, Columbiana, O.

264,918. Self-Luminous Paint.—William H. Balmain, Eversley, Ventnor, County of Hants, Isle of Wight, Eng.

264,934. Scaffold-Support. — Richard Deeves, New York, N. Y.

264,945. Sash-Fastener. — Samuel R. Hawley, Odin, Ill.

264,977. Speaking-Tube Annunciator. — Joseph Walter, New York, N. Y.

264,990. Fire-Place Attachment. — James P. Winter, Greenup, Ky.

265,012. Brick-Elevator.—John C. Bobzien, Chicago, Ill.

265,090. Illuminating-Grating.—Jacob Jacobs, New York, N. Y.

265,112. Water-Closet Valve. — Henry S. Lord and Cornelius Birkery, Hartford, Conn.

265,141. Pile. — Joseph W. Putnam, New Orleans, La.

265,163. Fire-Place. — James G. Smith, Cleveland, O.

265,174. Grate-Fender. — Stephen S. Stedman and William T. Barker, Jordan's Store, Ga.

265,217. Window-Ventilator.—Edward G. Caldwell, Newton Centre, Mass.

265,220. Automatic Gate for Elevators.—Geo. V. Delue, Boston, Mass.

SUMMARY OF THE WEEK.

Baltimore.

Building Permits.—Since our last report, (12) permits have been granted, of which the following are the more important:—

Saml. T. Williams, three-st'y brick building, w s Caroline St., bet. Baltimore and Hampstead Sts.

H. G. Willis, three-st'y brick building square, s s Pierce St., bet. Pine and Pearl Sts.

John Mehring, two-st'y brick stable, rear w s Fulton Ave., n of Laurale St.

Boston.

House. — Mr. W. H. Coffin is building a house, No. 202 Commonwealth Ave., 25′ x 60′, four-st'y, brick, with stone and terra-cotta trimmings; Mr. I. C. Hooper, mason; Mr. O. F. Smith, of Boston, architect.

Building Permits. — *Brick.*— *Mercantile St.*, cor. Clinton St., Ward 6, Estate of J. and E. Quincy, two-st'y mercantile and mechanical, 20′ x 80′; Wm. Carpenter, builder.

N St., near East Fourth St., Ward 14, for H. B. Stratton, 2 three-st'y dwells., 21′ x 50′; H. B. Stratton, builder.

Wood.— Tremont St., cor. Whitney Pl., Ward 22, for John J. Kennedy, three-st'y dwell., 23′ x 39′; McDonald & Tobin, builders.

Harlow St., near Howard Ave., Ward 20, for Abram Ripley, two-st'y dwell., 18′ 6″ x 35′; ell, 17′ x 21′ 6″; Abram Ripley, builder.

Maple St., near Wayne St., Ward 21, for Wm. D. Forbes, two-st'y dwell., 56′ x 60′; ell, 30′ x 40′; McNeil Bros., builders.

Highland Ave., near Cambridge St., Ward 25, for Jas. W. and John P. Loudon, 2 two-st'y hip dwells., 21′ x 39′; Samuel Davenport, builder.

East Third St., near N St., Ward 14, for C. C. Walworth, two-st'y dwell., 21′ x 31′.

Brook Ave., cor. North Ave., Ward 20, for Carl L. Diltmer, two-st'y dwell., 20′ x 32′; P. Hanlon, builder.

Holmes Pl., near Mill St., Ward 24, for Daniel L. Farnum, dwell., 20′ x 28′; John A. Tucker, builder.

Dudley Ave., near Washington St., Ward 23, for John Anderer, two-st'y dwell., 20′ x 28′; John String, builder.

Gerard St., near George St., Ward 20, for Thomas F. Scanlon, lumber storehouse, 32′ x 50′; Andrew Anderson, builder.

Beaumont St., near Carruth St., Ward 24, for Smith W. Nichols, three-st'y dwell., 30′ x 44′ 6″; Wm. J. Jobling.

Washington St., rear, near Green St., Ward 23, for Daniel Carroll, two-st'y dwell., 23′ x 30′; Wm. R. Hudson, builder.

Columbia St., rear of, near Quincy St., Ward 24, for A. W. Spencer, green-house, 30′ x 82′; E. B. Noyes, builder.

Central Ave., cor. Bellevue Ave., Ward 23, for Thomas Van Dyl, dwell., 18′ x 26′; G. W. Bemmink, builder.

Elm St., near Breed St., "Orient Heights," for M. F. Dearcy, three-st'y mansard dwell., 22′ x 28′; S. H. Griffin, builder.

Unnamed St., cor. Webster Ave., Ward 25, for John W. Hollis, 6 two-st'y dwells., 14′ and 20′ x 50′; Jacob W. Berry, builder.

Harlow St., rear, near Howard St., Ward 20, for Abram Ripley, storage, 20′ x 24′; Abram Ripley, builder.

Greenville St., near Winthrop St., Ward 20, for J. E. Came, two-st'y dwell., 19′ and 37′ x 26′ and 37′; H. C. Allen, builder.

Foster St., near Mt. Vernon St., Ward 23, for Horace W. Baxter, two-st'y dwell., 22′ x 35′.

Central Ave., near Berry St., Ward 23, for Geo. Thompson, dwell., 20′ x 26′; John A. Crosby, builder.

Green St., near Union Ave., Ward 23, for Mrs. R. A. Atwood, two-st'y store, 21′ x 30′; J. S. Atwood, builder.

Brooklyn.

Building Permits.—*Lafayette Ave.*, n s, 75′ w Sumner Ave., 5 two-st'y frame dwells.; total cost, $13,600; owners, Chas. and J. C. Debevoise, 104 Debevoise St.; architects and carpenters, Marinus & Gill; mason, S. J. Burrows.

Nostrand Ave., n e cor. Hancock St., 2 three-st'y brownstone dwells.; cost, each, $4,500; owner, F. M. Kinney, 418 Third St.; architect, J. G. Prague.

Hancock St., n s, 500′ e Bedford Ave., 3 three-st'y brownstone dwells.; owner, architect, and builder, S. E. C. Russell, 58 Hancock St.

Monroe St., s s, 275′ e Nostrand Ave., 4 two-and-one-half-st'y brownstone dwells.; cost, each, about $5,000; owner and architect, F. C. Vrooman, 444 Gates Ave.

Wyckoff St., n s, 120′ w Smith St., three-st'y brick stable and lofts; cost, $5,000; owner, P. Belford, 27 Wyckoff St.; architect, Chas. Werner; builders, J. J. Bentzen and H. J. Smith.

Suydam St., No. 9, n s, 140′ e Broadway, two-st'y frame dwell.; cost, $3,000; owner, Lena Fisher, 16 Myrtle St.; architect and builder, P. Johnson.

Adams St., e s, 25′ n Plymouth St., four-st'y brick store and office-building; cost, $13,000; owner, E.W. Bliss, Pearl, cor. Plymouth St.; builders, M. Reed and E. Snedeker.

Harmon St., n s, 208′ e Evergreen Ave., 25 two-st'y frame dwells.; cost, each, $2,500; owner and builder, J. Hopkins, Jr., 109 Grove St.; architect, E. R. Charlier.

St. Marks Ave., s w cor, Nostrand Ave, on rear, one-st'y stable; cost, $3,000; owner, D. R. Van Nostrand, on premises; architect and carpenter, W. C. Booth; mason, C. A. Barton.

Flatbush Ave., s s, cor. Dean St., four-st'y brick and stone stores and flats; cost, $9,000; owner, F. Darrigrand, 452 Dean St.; architect, F. E. Lockwood.

Jefferson St., n s, 250′ e Marcy Ave., 3 three-st'y brick dwells.; cost, each, $7,000; owner and builder, George H. Stone, 356 Stuyvesant Ave.; architect, G. A. Shellenger.

Gwinnett St., No. 164, s s, 175′ w Throop Ave., three-st'y frame tenement; cost, $4,500; owner, John Schlinger, 160 Gwinnett St.; architect, Th. Engelhardt; builders, Henry Grasman and D. Kreuder.

Moore St., Nos. 171, 173, 175 *and* 177, s s, 125′ e Bushwick Ave., 4 two-st'y frame tenements; cost, each, $8,500; owner, Maggie Julius, on premises; architect, Th. Engelhardt; builders, G. Herrlein and J. G. Hoepfer.

Nostrand Ave., s e cor. Monroe St., 6 four-st'y brownstone tenements; cost, each, $4,500; owner, architect and builder, G. W. Brown, 728 Fulton St.

Manhattan Ave., w s, 120′ n Norman Ave., three-st'y brick store and dwell.; cost, $5,500; owner, Adrian Meserole, 590 Lorimer St.; architect, Fred. Weber; builders, G. J. Roberts and S. M. Randall.

Third St., w s, abt. 50′ n South First St., three-st'y brick dwell.; cost, $5,000; owner, Daniel Driver; architect, E. F. Gaylor; builders, J. Rodwell and R. B. Ferguson.

Floyd St., s s, 350′ e Marcy Ave., 3 three-st'y frame tenements; cost, $3,000; owner, John Bernauer, Stockton St.; builders, G. Straub and J. Rueger.

Bridge St., n e cor. Plymouth St., four-st'y brick paint factory; cost, $16,000; owner, P. Cassidy, 1119 Madison Ave., New York; architect, M. J. Morrill; mason, George Phillips.

Chicago.

Houses. — J. V. Farwell is about to build a mansion on Pearson St., near Lake Michigan. The front will be marble from north shore of Lake Michigan. The dimensions are 65′ x 70′.

S. A. Kent is building a new house, of Philadelphia pressed brick, 60′ x 100′, on Michigan Ave., near Twenty-ninth St. The plans for both these residences were prepared by Burnham & Root.

Building Permits. — C. Dannehl, three-st'y and basement brick store and dwell., 24′ x 75′, 371 Ogden Ave.; cost, $6,000.

Mary Mott, two-st'y brick dwell., 22′ x 40′, 358 South Clinton St.; cost, $2,500.

John J. Karsters, two-st'y and basement brick store and dwell., 25′ x 62′, 177 West Harrison St.; cost, $3,500.

Paul Pundt, two-st'y and basement brick dwell., 21′ x 46′, 826 West Twelfth St.; cost, $3,000.

J. W. Jackson, Jr., two-st'y and basement brick dwell., 25′ x 50′, 273 Hubbard St.; cost, $3,000.

A. Moeller, three-st'y and basement brick store and dwell., 35′ x 72′, 685 West Chicago Ave.; cost, $5,000.

Edward Hudson, 9 three-st'y and basement brick stores and dwells., 56′ x 181′, 3108 Wabash Ave., and 293 to 309 Thirty-first St.; cost, $45,000.

Abe Klee, two-st'y and basement brick dwell., 22′ x 50′, 38 Cornell St.; cost, $4,500.

F. A. Kruse, three-s 'y and basement brick dwell., 26′ x 50′, 255 North Ave.; cost, $6,000.

Fred B. Clarke, two-st'y and basement brick store and dwell., 21′ x 60′, 628 Twelfth St.; cost, $3,200.

J. A. Whidden, two-st'y and basement brick dwell., 22′ x 60′, Twenty-second St., cor. Jones Pl.; cost, $6,000.

J. A. Homan, two-st'y and attic brick dwell., 22′ x 50′, 1122 Fulton St.; cost, $4,000.

Fortune Bros. Brewing Co., four-st'y and basement brick ice-house, 66′ x 93′; Pearce St., near Desplaines St.; cost, $20,000.

J. H. Brooks, 2 three-st'y and basement brick dwells., 23′ x 52′ each, 612 and 614 Division St.; cost, $18,000.

Samuel Burkhardt, 2 three-st'y and basement brick stores and dwells., 48′ x 66′, 3817 and 3819 Halsted St.; cost, $10,000.

Nathan Davis, three-st'y brick dwell., 20′ x 25′, 1609 Wabash Ave.; cost, $3,000.

J. L. Stewart, two-st'y and basement brick dwell., 28′ x 47′, 540 and 542 West Van Buren St.; cost, $7,000.

J. H. Thompson, 2 three-st'y brick dwells., 44′ x 56′; Nos. 15 and 17 Seymour St; cost, $8,000.

M. J. Andryzayk, two-st'y brick store and dwell.; No. 673 Ashland Ave.; cost, $5,000.

H. V. Bemis, two-st'y and basement brick addition, 16′ x 50′; No. 2322 Indiana Ave.; cost, $5,000.

James Lyons, 2 one-st'y cottages, 22′ x 40′ each; Thirty-third and Jones Sts.; cost, $2,500.

A. W. Harlow, two-st'y and cellar brick dwell., 23′ x 86′; No. 475 Congress St.; cost, $6,000.

Peter Schoenhover, brick elevator. 72′ x 100′; Crawford Ave., near Canal St.; cost, $50,000.

Clark, Raffen & Co., four-st'y and basement brick machine shop, 50′ x 72′; Ohio St. near Kingsbury St.; cost, $12,000.

J. W. Rich, three-st'y and basement brick dwell., 22′ x 62′; No. 265 La Salle Ave.; cost, $8,500.

A. Seeberger, 3 one-st'y brick cottages, 20′ x 30′, each; Thirty-seventh Court, near Butler St.; $3,000.

E. L. Smith, three-st'y brick basement, store and dwell., 24′ x 70′; No. 260 Division St.; cost, $5,600.

A. Elmars, three-st'y brick store and flats, 25′ x 50′; No. 3159 State St.; cost. $5,000.

J. A. Green, two-st'y and basement brick dwell., 21′ x 45′; No. 329 Idaho St.; cost, $2,500.

John Palvey, two-st'y and basement brick dwell., 20′ x 42′; No. 72 Millard Ave.; cost, $3,000.

M. Milligan, three-st'y and basement brick dwell., 27′ x 40′; No. 323 Franklin St.; cost, $5,000.

Sutter Bros., 3 three-st'y brick dwells., 50′ x 72′; Nos. 3551 to 3553 Lake Ave.; cost, $15,000.

J. W. Wilson, brick basement, 22′ x 54′; No. 3032 Wentworth Ave.; cost, $2,800.

James Todd, two-st'y brick addition, 30′ x 65′; No. 331 to 333 Wabash Ave.; cost, $3,000.

A. C. Norris; two-st'y and cellar brick dwell., 25′ x 62′; No. 458 Congress St.; cost, $7,000.

Louise Fowler, three-st'y brick dwell., 20′ x 64′; No. 15 Willard Place; cost, $8,000.

Frances Rew, three-st'y and basement brick dwell., 24′ x 60′; No. 562 N. Wells St.; cost; $7,500.

Bartholomee & Leicht, three-st'y and attic brick dwell., 50′ x 75′; Sedgwick St., near Centre St.; cost, $16,000.

E. Uehlein, two-st'y and basement dwell., 24′ x 50′, No. 58 Granger St.; cost, $7,000.

Wm. Gilman, three-st'y and basement brick factory, 41′ x 60′; Nos. 132 and 134 Lake St.; cost, $4,000.

D. P. Peck, three-st'y brick dwell., 25′ x 60′; No. 59 Bryant Ave.; $5,000.

Honora Graham, three-st'y basement, store and dwell., 23′ x 60′; No. 78 Douglas Ave.; cost, $3,000.

Geo. Lauterbach, two-st'y and attic brick dwell., 24′ x 30′; No. 51 Thirteenth St.; $2,500.

Frank Flava, two-st'y and basement brick dwell., 21′ x 50′; No. 442 Nineteenth St.; cost, $3,000.

Cincinnati.

Annual Report.—We learn from the advance sheets of the forthcoming annual report of the Builders' Exchange that during the year last past a total of 34,000 cubic yards of sand was used in connection with building of this city at a total cost of over $120,000; and that the amount of lime used was 600,000 bushels.

Art Museum.—Ground was broken last week for the new Art Museum building in Eden Park. The contracts for building the cellar have been awarded, and it is expected to push this part of the work as fast as the weather will permit. Mr. McLaughlin the architect is at work on the rest of the plans.

Building Permits.—John Werner, two-st'y brick dwell., 1620 Eastern Ave.; cost, $4,000.

Aug. Enneking, two-st'y brick dwell., Woodburn Ave., near Lincoln Ave.; cost, $3,500.

John Koeler, two-st'y brick dwell., Wheeler St., near Calhoun St.; cost, $2,100.

Four permits for repairs; cost, $2,000.

Cleveland.

Building Permits.—*Sibley St.*, 6 stone dwells.; cost, $24,000; owner, I. Reynolds; architect, J. W. Blackburn.

Sibley St., frame dwell.; cost, $5,000; owner, Frank Hart, architects, Coburn & Barnum; builders, Cass & Co.

Cedar Ave., double frame dwell.; cost, $7,000; owner, Wm. Goodwin; architects, Coburn & Barnum; builder, Mr. Young.

Franklin St., church; cost, $30,000; owner, First Congregational Church; architects, Coburn & Barnum; builders, Co-Operative Building Co.

Marquett St., brick wire mill; cost, $27,000; owners, Otis & Co.; architect, F. O. Bate; builder, Jno. T. Watterson.

Kennard St., frame dwell; cost, $3,000; owner, Chas. S. Paddock; architect, F. C. Bate, builder, Jno. Foote.

Broadway, frame store and dwell.; cost, $3,500; owner, Jno. Sheehan; architect, F. C. Bate.

Scott St., frame dwell.; cost, $2,000; owner, G. C. Barnes; architect, F. C. Bate.

Frankfort St., brick building; cost, $5,000; owner, Jno. A. Vincent; architect, Walter Blythe.

Seneca St., brick building; cost, $60,000, owner, Jos. Perkins; architect, J. H. Edleman; F. H. Norton, Supt.

Prospect St., frame residence; cost, $20,000; owner, J. H. Ely; architect, Wm. Dunn; builder; Mr. Cass.

Wire St., acid works; cost, $12,000; owners, Hayes & Co.; architect, F. C. Bate; builder, Jno. T. Watterson.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & CO., Boston, Mass. No. 355.

OCTOBER 14, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE Commission of Experts appointed to examine the ceiling of the Assembly Chamber in the new Capitol at Albany has presented its report, which, coming from persons so distinguished in their profession as Professors Trowbridge and Babcock and Mr. George B. Post, must be considered as a final presentation of the case. Most architects will remember that the ground under the building is not of the firmest character, and some very interesting work in the way of testing its resistance, and spreading the base of the structure by means of concrete, was done by Mr. McAlpine when the structure was first begun. By the change in design under the new architects, Messrs. Eidlitz and Richardson, some important modifications were made in the distribution of the weight upon the foundation, particularly on the portion under the Assembly Chamber, which was loaded with the weight of an immense stone vault in addition to that which it was originally intended to carry. Perhaps the masonry of the foundation was also less uniform than it should have been, but however that might be, the great vault was hardly finished before evidences of unequal settlement began to present themselves. The effect of this was naturally more marked in the vault than elsewhere, and the splintering of the stones and opening of joints in that conspicuous portion of the building excited an alarm which proves to have been justified. In view of the uncertainty whether the sub-soil, already loaded beyond the intended limit, can be depended upon for permanent resistance, as well as of the alterations in form which have already taken place, and may continue, the commissioners reluctantly recommend that the architect be instructed to remove all the stone vaulting, except perhaps the four small corner vaults, and to supply the place of the groined ceiling with a construction of wood. In that way, they observe, a very considerable weight would be removed from the foundation, and the thrust of the present vault being reduced to a trifling amount another element of possible danger would be avoided. The cracks which exist in some other portions of the building are not considered by the experts to be of serious consequence, unless the unequal settlement of the foundations or subsoil, to which they are due, should continue. There can be no doubt of the wisdom of these recommendations, and although it will be a matter of much regret to architects to see the noble ceiling, — one of the widest groined vaults in the world — removed to make room for a wooden shell, it would be foolhardy to retain it to the peril of the occupants of the room. Under the circumstances, no reflection is cast upon the architects of the building by the removal of the vault; and we can only regret that any part of the future reputation of the designer of the Assembly Chamber must rest upon the memory of those who have had the privilege of seeing his work before its demolition.

WE have received from the Secretary of the American Institute of Architects a revised list of the members of the Institute, brought down to the middle of last summer. The first observation which we make is that the number of Fellows of he Institute has increased very materially of late, so that, in deed, the constitutional limit is nearly reached. Two years ago, when the Convention of the Institute decided that no more than seventy persons should at any time hold the rank of Fellow, this number was thought to be quite large enough to include all who were, or would for a long time be, deserving and desirous of attaining it. Now, however, although but one Convention has passed since the determination to restrict fellowship was taken, two vacancies only remain to be filled, and unless the restriction should be removed, the list will in a month or two be complete. The intention of those who voted to restrict the number of Fellows, in order to make that grade a distinction to be conferred on account of professional eminence, was so good that although the limit of seventy members is now shown to be too low, it is to be hoped that the next Convention, which will undoubtedly have to consider the question, may, while extending the number of Fellows, perhaps to one hundred, improve the opportunity to provide for some mode of selection among the candidates. The Trustees, for instance, instead of accepting all unobjectionable applicants, as has hitherto been the rule, might with propriety be instructed to make choice among them, waiting, for instance, until ten candidates were listed, and then electing three, or in some other way exercising a discretion which would be beneficial to the Institute, since it would improve the value and significance of the grade of Fellow, while it would inflict no hardship upon worthy aspirants beyond a delay in their election, the length of which would depend upon the number of more distinguished candidates who might present themselves.

IN view of the extraordinary apathy which seems to have been shown by the people of New York in regard to raising funds for preparing a pedestal for their great statue of Liberty, a proposition was made a few days ago before the Beacon Club, an association of enthusiastic Bostonians, that the donors of the statue should be invited to change its destination, and present it to the citizens of Boston, who would, it was thought, be more disposed to appreciate the value of the gift and the friendly sentiments of those who offer it. The report of this suggestion naturally aroused the secretary of the New York committee appointed to secure the money for the pedestal, who explained that owing to differences among the members of the committee nothing had been done in the way of soliciting contributions, and not a dollar had been collected. As the inauguration of the statue is intended to take place next year, and something like a hundred and fifty thousand dollars' worth of stone-work must be done before the pedestal is ready, it certainly seems to be quite time that steps were taken toward opening the subscription lists. Bedloe's Island, the proposed site of the statue, has been cleared and transferred to the committee by the United States Government, which spent about seventy-five thousand dollars in preparing a foundation for the pedestal before the transfer was made. It is said that the disputes among the committee relate to the question whether the money should be solicited from capitalists or raised by popular subscription. If this is all that stands in the way of the completion of the enterprise, it seems as if a compromise might be effected by having certain members of the committee circulate subscription papers among the populace, while the others labor with the capitalists. If any excess of funds should flow in as the result of this two-fold appeal, we would suggest that a portion of the surplus might be expended in paying somebody to write a letter of thanks for their gift to the Union Franco-Americain and M. Bartholdi, who must be almost tired of waiting for this ceremony.

THE New York steam-heating and power companies seem to have a very bright prospect before them. Two separate corporations, the American and the New York Company, have mains laid through the streets in the lower portion of the city. The former has not yet begun to furnish steam to its subscribers, but four miles of main pipe are laid, and delivery will commence in about two weeks. The New York Company already sells regularly eight hundred horse-power of steam, and within a week or two, at the beginning of the cool weather, received more than five times as many applications for private connections as could be filled. In Cortlandt Street and Maiden Lane about one building in every three has introduced the

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steam from the New York Company's mains, and the number will probably be much increased before the winter is over. The explosion which is reported to have taken place in Broadway not long ago proves to have been due to a defective valve, and other annoyances have resulted from the same cause. The condensation of steam in the pipes seems not to be serious, but the American Company, to reduce this to the smallest possible amount, protects its mains by laying them in trenches filled with lamp-black. One might suppose that plaster-of-Paris would be equally effective as a non-conductor, besides being more readily handled, and free from all danger of spontaneous combustion on the opening a trench; but the American Company undoubtedly understands its own business best.

The old Cradock house at Medford, Mass., the most ancient civilized habitation in America, is to be destroyed unless public interest can be sufficiently aroused to rescue it from the hands of its present owners. Built in 1634 for the first Governor of the "Company of the Massachusetts Bay," with the thick walls and loopholes for defence against Indian assaults which were then common, it has been almost constantly occupied for two hundred and forty-eight years, and although it has sunk from the position of a vice-regal mansion to that of a squalid tenement-house, it still possesses an interest second to that of no other building in the United States, and of very few dwelling-houses in the world. The number of inhabited houses two centuries and a half old is not very large in any country, and those whose construction shows them to have been the fortified outposts of civilization struggling in the midst of an almost forgotten barbarism are still more rare. Two thousand years ago the Romans built a magnificent temple to shelter the little hut of Romulus, which had been religiously preserved for five centuries in its place on the Capitoline hill; and while our early history affords no Romulus to be reverenced as the founder of the nation, the respect which we owe to our resolute and upright ancestors should make us hesitate to lay our sacrilegious hands on the few remaining memorials which we possess of their struggles and their victory.

A reporter of the New York *Evening Post* has had an interview with Mr. Edison on the subject of the dangers from exposed electric-light wires; the occasion of the interview having apparently been the death of a workman who was killed by the current from the wire of a Brush arc-lamp a few days ago. To the reporter Mr. Edison confided his opinion that such accidents would continue to increase with the multiplication of wires carrying powerful currents, until some dreadful accident occurred to arouse public indignation, and compel the placing of all such wires underground. In case of fire, particularly, the breaking of a great number of wires, which would be thrown down in inextricable confusion by the fall of a roof, might lead to serious consequences. Mr. Park Benjamin, a well-known scientific man, has already called the attention of the *Evening Post* to the fact that a stream of water from a hose nozzle, striking a broken arc-light wire, might easily serve to conduct the current through the body of the fireman who held the hose, with fatal consequences; while the cutting of such a wire with an axe, particularly if the handle of the axe were wet, might have the same effect upon the person using the axe. At this time, when fifty or a hundred telegraph and telephone wires are often stretched over the roof of a single building, the dragging of a broken arc-light wire over them might scatter destruction in scores of places. The Brush Company is said not to run its lines over roofs, preferring to use poles exclusively; but other corporations are not so scrupulous, and any one who has occasion to visit the tops of mercantile buildings must often notice, not without some apprehension, the heavy arc-light wires suspended very near him.

The question of repressing the reckless hydraulic mining in California, by which the channels of navigable streams are obstructed, and farming lands laid waste, has assumed great importance in that State, where it enters as an issue into political and personal disputes. As hydraulic mining is usually carried on, a mountain stream is collected in a strong iron pipe, and carried to some place from which it can be directed through a movable nozzle against a gravel bank. The hydrostatic pressure often gives immense force to the stream, tearing away the bank rapidly, and allowing the heavy particles of gold to fall into the receptacles prepared for them, while the lighter débris is carried down into the nearest water-course, and so to the rivers. As the farmers whose most fertile fields are thus deluged with silt and destroyed have no interest in the mining, they naturally look upon this unscrupulous appropriation of the rivers to drain away the mining refuse as a gross invasion of their rights, from which they think they should be protected by the public authority; and in this we imagine that most persons will agree with them. It is estimated that one hundred thousand acres of the finest land in the State has been covered with gravel and ruined, and much more will soon be destroyed in the same way. If this estimate is correct, considering, as we are probably justified in doing, that the product of these fields, if kept in order, would be worth a hundred dollars an acre every year, clear of all expenses except ground rent, the annual value in perpetuity of the land so destroyed would be ten million dollars, and the State, through its citizens, would be so much richer every year. The hydraulic mining, on the contrary, is a temporary expedient for extracting as rapidly as possible a deposit of gold already nearly exhausted, and the gravel banks once gone no further use can be made of the land occupied by them; so that in estimating the comparative value of the hydraulic mines and the fields sacrificed to them we must take the product of the former as a gross sum, while that of the latter may be regarded as the perpetual income ot a certain capital. Placing the rate of interest at four per cent, the value as capital of the one hundred thousand acres of land now covered with débris would be two hundred and fifty million dollars; and unless the hydraulic mines have already produced the same, or a larger sum, in cash, they have been worked at a manifest loss to the community. It is, we presume, safe to say that nothing like this amount of gold has yet been taken from the mines whose débris is complained of; and in that case the owners of the mines have virtually presumed on the forbearance of their neighbors and the public to compel them to pay two, three, four, or five dollars for every dollar which they have put into their own pockets.

At a recent scientific congress in Switzerland Herr Riniker, the chief forester of the Canton Aargau, in discussing the cause and possible mode of prevention of hail-storms, asserted that hail was unknown in wooded countries, and mentioned, as an illustration within his own experience, that a certain district in the southern portion of his canton, at the foot of the chain of mountains known as the Lindenberge, was never visited by hail until about twenty years ago, when two wide gaps were cut in the forest which clothed the sides of the range. Frequent hail-storms then occurred in the valleys, the clouds being observed to descend through the gaps in the forest. In 1868 the wider of the gaps was closed by a plantation of young firs, and since 1871, when the trees had probably just obtained a firm foothold, no hail-storm had crossed the mountains. Herr Riniker's theory is that the hail-clouds being always charged with positive electricity, and the trees acting to diffuse the negative electricity of the earth into the atmosphere, the meeting of the two currents generates heat enough to thaw the hail-stones. This explanation is not extremely satisfactory, but the record of the facts is none the less valuable on that account.

Some curious experiments are said to have been made by M. Le Bon to determine the character of the poisonous components of putrescent substances, and the action of disinfectants upon them. According to the *Scientific American*, the effect of antiseptics diminishes as putrefaction advances, while the disinfecting action of most substances bears no relation to their effect in destroying microscopic organisms. Moreover, the character of the noxious products of putrefaction changes materially as decomposition advances: the poisonous quality appearing to be contained at first in the non-volatile products, to make its appearance later, and with peculiar virulence, in the volatile compounds. To show this, frogs were confined in an enclosure with a small quantity of a liquid obtained by macerating chopped meat in water. The liquid soon became very offensive, and so poisonous as to cause death if injected under the skin of an animal; but the frog which merely breathed the effluvium was uninjured. After two months of fermentation the liquid lost its septic effect on the blood, and could be injected into the circulation without injury, but its vapor became excessively poisonous, so that the animals which inhaled it died. This observation, which seems to be quite new, explains the unwholesomeness of the air of cemeteries, which is sufficiently established by evidence, but has not been thought to be sufficiently accounted for as a scientific phenomenon.

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THE SIPHONAGE OF TRAPS.

IN the interest of chronological exactness, if for no other reason, it is proper to say that nearly two years ago I applied to the National Board of Health for an appropriation for experimenting on the siphonage of traps. This was granted, and the work was carried on with some thoroughness between June 6, and December 22, 1881. Subsequently, I reported my results to the National Board of Health, and the report was put in type for publication in the *Bulletin*. Publication was postponed for a time because the results shown and the deductions drawn were not in accordance with the theories on which the prescriptions of several Boards of Health had been based. It was thought best not to embarrass the efforts of these bodies to obtain certain legislation by calling attention to what might be considered an error in some of their recommendations. Some time after this, the National Board requested Mr. E. S. Philbrick, of Boston, to repeat my experiments, I think in 1882, with apparatus somewhat differently arranged. Mr. Philbrick's report has been published in these pages. As no allusion is therein made to my earlier connection with the subject, it would be only just to me, and it may be useful to publish my results also. My report is as follows: —

Appended to this report[1] are the following drawings, viz.: —

1. Apparatus used in Experiments I to VII.
2. Manner of extending soil-pipe at top.
3. Anti-siphoning, 4″ x 2″ Y-branch.
4. Manner of discharging contents of water-closet bowl.
5. Common S-trap, of glass.
6. Bower's trap.
7. Garland's trap.
8. Brandeis's "Paragon" trap.
9. Nicholson's mercury seal-trap.
10. Apparatus used in Experiment VIII.

Figure 1 illustrates the apparatus used in the Experiments I to VII. *A* is a common *bath-tub*, of about 80 gallons capacity when completely filled, with a 1½-inch lead waste, entering the main soil-pipe through a 4 by 2 inch Y-branch. The outlet of the bath-tub was closed by means of a conical-shaped 2-inch valve, operated by chain and lever. The 2-inch outlet was not obstructed, as is usual, by a strainer.

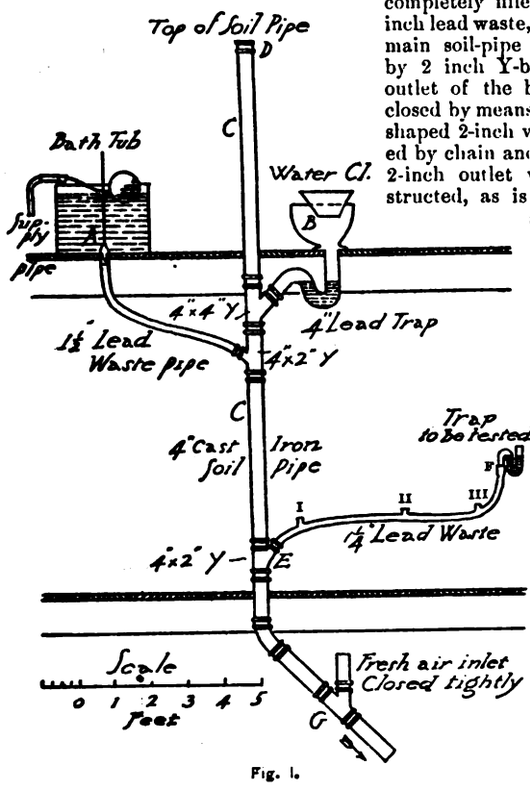

Fig. 1.

B is a *common "pan" closet*, with bowl attached, and with a 4-inch lead trap, having about 1 inch of seal, and entering the soil-pipe through a 4 by 4 inch Y-branch.

C is the *main soil-pipe*, of cast-iron, 4 inches in diameter. Into the socket at top, *D*, of soil-pipe, a flap-valve was placed in certain experiments, closing the top of soil-pipe quite tightly. In other experiments a tin pipe, of dimensions as shown in Figure 2, was inserted at top of soil-pipe, in order to increase its length.

E is a 4 by 2 inch Y-branch, which receives a 1¼-inch horizontal lead waste, with a cup, *F*, at its end, into which the different traps to be tested were inserted and tightly joined by putty. This waste was provided with vents, I, II, and III, which were alternately opened and closed in some of the experiments described.

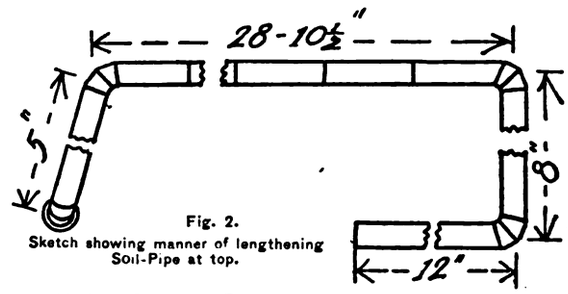

Fig. 2.
Sketch showing manner of lengthening Soil-Pipe at top.

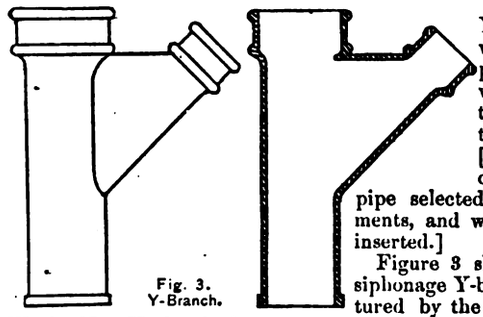

Fig. 3.
Y-Branch.

G is a 4 x 3 inch Y-branch, from which a fresh-air pipe branches, which was closed tightly during all the experiments. [This was a part of the original soil-pipe selected for the experiments, and was not purposely inserted.]

Figure 3 shows the "Anti-siphonage Y-branch," manufactured by the J. L. Mott Iron Works, New York, which was used in certain experiments in place of the common 4 by 2 inch Y-branch at *E*.

The bath-tub was emptied, when quite full, in one minute and twenty seconds.

Figure 4 shows the manner in which the water-closet bowl was filled and emptied, discharging at each time about 2½ gallons of water. The pan was drawn quite back, and a funnel inserted, kept filled with water, as it was found that a discharge from the bath-tub would draw all the water out of the pan, and would also unseal the 4-inch lead trap in certain experiments *with a closed soil-pipe*. The discharge was effected by lifting the funnel and allowing all the water to rush out of the bowl. In a number of the experiments, in order to make the test more severe, a large stable-bucket of water was poured into the bowl of the closet, while discharging, as fast as the outlet would receive it without overflowing the bowl.

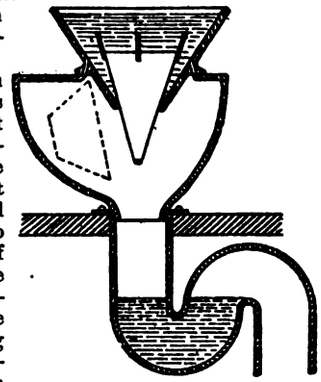

Fig. 4.

Figure 5 shows one of the *common S-traps*, which for the purpose of experimenting were made of thick glass pipe, the interior diameter of the pipe being 1¼" with different depths (*H*) of water-seal, namely: 3″, 3½″, 4½″, 5″.

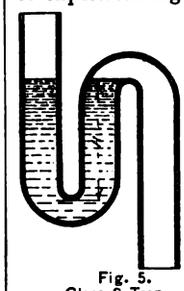

Fig. 5.
Glass S-Trap.

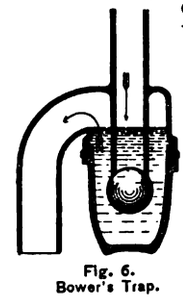

Fig. 6.
Bower's Trap.

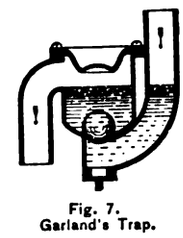

Fig. 7.
Garland's Trap.

The glass pipe was somewhat contracted at the upper and lower bends, owing to inaccuracy of manufacture.

Figure 6 shows *Bower's trap.*

Figure 7 shows *Garland's trap.*

Figure 8 shows *Brandeis's "Paragon" trap*, which seems to be in principle substantially the same as Adee's trap, without having the enlarged air and water chamber of the latter.

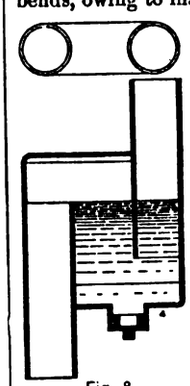

Fig. 8.
Brandeis's "Paragon" Trap.

Figure 9 shows the *Nicholson "Mercury Seal" trap*, which being entirely of glass, was necessarily shaped somewhat differently from the trap as sold.

The *Cudell trap* arrived too late for trial, but it seems to be substantially the same as the Garland trap.

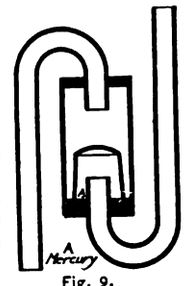

Fig. 9.
Nicholson's Mercury Seal-Trap.

[1] Made under direction of Col. Geo. E. Waring, Jr., Newport, R. I., for the National Board of Health.

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EXPERIMENTS.

I. — *Top of soil-pipe tightly closed, no vent open.*

The experiments were made as follows: First, the bath-tub was entirely filled, and its contents, only, discharged by opening the 2-inch valve. Then the water-closet bowl was filled and the water discharged in the above-described manner. Thirdly, the bath-tub and the water-closet were both filled and emptied together.

The result in all three cases was as follows, viz.: *All the traps were completely siphoned, i. e.*, all the water was drawn from the S-traps; the water in Bower's trap was lowered about $\frac{7}{16}$ of an inch below mouth of inlet-pipe, allowing the top of the India-rubber ball to drop below this inlet-pipe; all the water was drawn from Garland's trap, also from Brandeis's "Paragon" trap, and from Nicholson's "Mercury Seal" trap. In the latter trap the mercury remained untouched, and the porcelain cup dropped into place, thus forming a seal. In Garland's trap the metal ball dropped back into its seat, thus forming a seal dependent on the accuracy of its fit.

II. — *Top of soil-pipe closed.*

a. Vent No. I open:
1. Bath alone emptying: S-trap (3-inch water-seal) loses $\frac{1}{2}$ inch of water.
2. Water-closet alone emptying: S-trap (3-inch water-seal) loses $\frac{1}{8}$ inch of water,
3. Bath and water-closet emptying together: S-trap (3-inch water-seal) loses 1 inch of water.

b. Vent No. II open:
Tests 1, 2, and 3 give same results as above with S-trap (3-inch seal).

c. Vent No. III open:
Results same as above with S-trap.
The mechanical traps were not tested in these experiments.

III. — *No vents open; valve on top of soil-pipe more or less open.*

a. Bath emptying alone:
If valve on top of soil-pipe was open —
$\frac{1}{8}$ of an inch all round, S-trap lost 1 inch of water.
$\frac{1}{4}$ of an inch all round, S-trap lost $\frac{1}{2}$ inch of water.
$\frac{3}{8}$ of an inch all round, S-trap lost $\frac{1}{4}$ inch of water.
$\frac{1}{2}$ of an inch all round, S-trap lost $\frac{3}{16}$ inch of water.
If valve was entirely open, S-trap lost $\frac{1}{8}$ inch of water.
If valve on top of soil-pipe was entirely open, Bower's and Garland's traps lost no water, no motion of balls was perceptible.
Other mechanical traps were not tested.

b. Bath and water-closet discharging together:
If valve on top of soil-pipe was open —
$\frac{1}{8}$ of an inch all round, S-trap lost $1\frac{1}{2}$ inch of water.
$\frac{1}{4}$ of an inch all round, S-trap lost $1\frac{1}{16}$ inch of water.
$\frac{3}{8}$ of an inch all round, S-trap lost $\frac{3}{8}$ inch of water.
$\frac{1}{2}$ of an inch all round, S-trap lost $\frac{5}{16}$ inch of water.
If valve was entirely open, S-trap lost $\frac{1}{4}$ inch of water.
If valve on top of soil-pipe was entirely open, Bower's and Garland's traps lost no water. Other traps not tested.

IV. — *Soil-pipe open at top; vents I, II, and III opened successively.*

If either the bath-tub alone, or bath-tub and water-closet were discharged together, the S-trap (with 3-inch water-seal) *lost no water at all;* there was only a slight vibration of the water surface with either vent open. Bower's and Garland's traps showed no motion of the water or ball. Other traps not tested.

V. — *Soil-pipe lengthened by an additional 54 feet, with four bends (See Fig. 2.) laid horizontally; open at end; no vent open.*

a. Bath alone emptying:
S-trap (3-inch seal) loses $\frac{3}{8}$ inch of water.
"Paragon" shows strong vibration of water.

b. Water-closet alone emptying:
S-trap (3-inch seal) loses $\frac{1}{4}$ inch of water.
"Paragon" trap shows vibration of water,

c. Water-closet and bath emptying together:
S-trap (3-inch seal) loses $\frac{1}{2}$ inch of water.
"Paragon" trap loses $\frac{1}{4}$ inch of water.
Other traps not tested.

VI. — *Soil-pipe lengthened as above (see Fig. 2); open at end; vent No. I open.* [No difference in result obtained by opening other vents.]

a. Bath emptying alone:
S-trap (3-inch seal) not affected.
Bower's trap not affected.
Garland's trap not affected.
"Paragon" trap shows slight vibration of water.

b. Bath and water-closet emptying together:
S-trap (3-inch seal); water-seal not affected; slight agitation of water surface.
Bower's trap shows slight vibration of ball, but loses no water.
Garland's trap shows very slight vibration of the water surface.
"Paragon" trap shows slight vibration of water surface.

VII. — *Inserted Mott's anti-siphoning Y-branch.* (*Fig.* 3.)

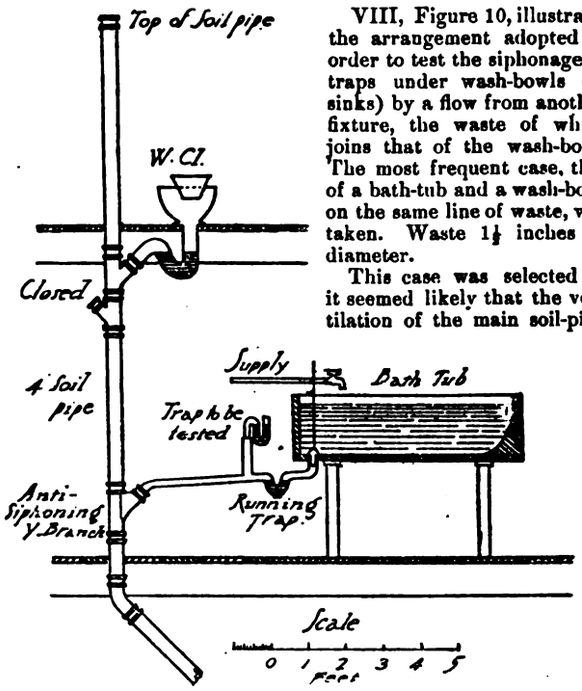
a. Soil-pipe closed (not extended); no vent open:
1. Bath emptying alone:
The water from all S-traps was completely siphoned; Garland's trap and Brandeis's "Paragon" completely siphoned.
In Bower's trap water level fell $\frac{1}{2}$ inch below bottom of inlet-pipe; the India-rubber ball dropped, unsealing mouth of inlet-pipe.

b. Soil-pipe open (not extended); no vent open:
1. Bath running alone:
S-trap loses $\frac{5}{16}$ inch of water.
"Paragon" trap shows vibration of water.
Bower's trap shows no motion of water.
Garland's trap, no motion of water perceptible.
2. Water-closet running alone:
S-trap loses $\frac{1}{4}$ inch of water.
Other traps not tested.
3. Water-closet and bath-tub emptying together:
S-trap loses $\frac{1}{2}$ inch of water.
"Paragon" trap loses $\frac{1}{8}$ inch of water.
Bower's trap shows only slight vibration of ball.
Garland's trap was not affected.

c. Soil-pipe open (not extended); one vent open (either I, II, or III):
1. Bath emptying:
S-trap (3-inch seal) loses a few drops of water.
2. Water-closet running:
S-trap loses a few drops of water.
3. Water-closet emptying together with bath-tub:
S-trap loses $\frac{1}{16}$ inch of water.
Bower's and Garland's traps show no effect in any case. Other traps not tested.

d. Soil-pipe closed; vent III open:
1. Bath alone emptying:
S-trap loses $\frac{3}{8}$ inch of water.
Bower's trap not affected.
Garland's trap not affected.
2. Water-closet emptying:
S-trap loses $\frac{1}{4}$ inch of water.
Other traps not tested.
3. Water-closet and bath running together:
S-trap loses $\frac{1}{8}$ inch of water.
Bower's trap shows slight movement of ball, but loses no water.
Garland's trap is not affected.

e. Soil-pipe extended by additional 54 feet; open at end; no vent open:
1. Bath alone emptying:
S-trap (3-inch seal) loses $\frac{1}{2}$ inch of water.
Bower's trap shows hardly any vibration.
Garland's trap shows hardly any vibration.
"Paragon" trap lost $\frac{1}{4}$ inch of water.
2. Water-closet alone emptying:
S-trap loses $\frac{3}{8}$ inch of water.
Bower's trap shows hardly any vibration.
Garland's trap shows hardly any vibration.
"Paragon" trap loses $\frac{1}{4}$ inch of water.
3. Water-closet and bath emptying together:
S-trap loses $\frac{3}{8}$ inch of water.
Bower's trap loses a few drops of water.
Garland's trap loses a few drops of water.
"Paragon" trap loses $\frac{3}{4}$ inch of water.



VIII, Figure 10, illustrates the arrangement adopted in order to test the siphonage of traps under wash-bowls (or sinks) by a flow from another fixture, the waste of which joins that of the wash-bowl. The most frequent case, that of a bath-tub and a wash-bowl on the same line of waste, was taken. Waste $1\frac{1}{2}$ inches in diameter.

This case was selected as it seemed likely that the ventilation of the main soil-pipe by full-size extension at the top would not reduce the siphoning action of the flow from the bath-tub, if this flow should be sufficient to fill the section of the waste-pipe to a point past the junction of the wash-bowl waste.

The experiments demonstrated the truth of this supposition.

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There was no perceptible difference in the siphonage of any of the traps tested, whether the top of soil-pipe was open or closed.

With an *open, ventilated soil-pipe*, arranged as above, a flow of about 80 gallons of water from the bath-tub had the following effect on different traps:

a. S-trap with 3 *inches water-seal* had all its water carried out, except that portion below the lower bend of trap; in other words, its seal was just broken.

b. S-trap with 3½ *inches water-seal* showed the same results.

c. S-trap with 4½ *inches water-seal* had about two inches of water-seal left after emptying the bath-tub. The suction was sufficient just to hold up 4½ inches of water. No air-bubbles were sucked through the lower bend of trap. In other words, one-half of the water was withdrawn.

d. "*Paragon*" *trap* had 2 inches of water taken out; the seal was therefore broken.

e. Bower's trap had only a few drops of water carried out by suction; the ball rotated heavily and allowed air to pass, thus breaking the vacuum, which occurred at regular intervals. There was, in addition to the ball-seal, sufficient water left to form a seal.

f. Garland's trap had ⅞ inches of water taken out. The ball was agitated violently by the suction, allowing air to pass from the inlet next to bowl. There was, however, sufficient water left to form a seal in addition to the ball-seal.

g. Nicholson's trap was not tested, the earlier experiments having shown that the suction could not be great enough to break the mercury-seal, even if all water should be carried out.

All these experiments were made with the funnel-shaped outlet of the bath-tub.

This was replaced by the common outlet of a tub, with strainer and plug (about 1½ inches diameter), and all the experiments repeated.

The results of this second set of experiments did not differ from those first obtained.

DEDUCTIONS.

The experiments described above were made under my direction, and under the immediate supervision of my assistant, William Paul Gerhard, C. E. Their accuracy is beyond question.

Their results do not sustain the theory upon which are based the recommendations of many sanitary engineers, and the requirements and suggestions on the subject of several Boards of Health.

It is possible that that theory has been based on experiments with small glass pipes flushed by volumes of water relatively much greater than the soil-pipe of a house is ever called upon to carry. There is no doubt that if my trials had been made with a sufficient discharge of water to fill the soil-pipe nearly or quite full, their result would have been the same as that of trials with small pipes; but this cannot occur in practice.

As we used a bath-tub containing about 80 gallons, with a 2-inch outlet unobstructed by a strainer, the tub being emptied in *one minute and twenty seconds*, and a water-closet discharging its full contents, and often a large bucket of water in addition, in one body at the same time, we secured a volume of flow past the branch on which the traps were tried greater than can occur in ordinary practice.

The following deductions seem to be justified:

1. The flow of drainage through a 4-inch vertical soil-pipe not ventilated at the top produces a very strong suction on branch pipes, the mouths of which it passes.

2. The opening of the 4-inch soil-pipe at the top practically prevents such suction even when the upper part of the pipe is 70 feet in length and circuitous in its course.

3. If each bath-tub, wash-basin, sink, etc., wastes by an independent outlet to a branch of a 4-inch soil-pipe open at the top, the siphoning of even ordinary S-traps having more than one inch of seal is not to be apprehended.

4. If one vessel discharges into a branch leading from another vessel, the discharge of the latter may produce a suction on the S-trap of the former sufficient nearly or quite to break its seal, unless of unusual depth.

5. Where the conditions are as described in paragraph 4, the suction is not sufficient to cause the ball of Bower's trap to drop away from its bearing, nor is it sufficient entirely to remove the water from traps which, like Garland's and Cudell's, are closed by a valve bearing vertically downward upon its seat.

6. Brandeis's "Paragon" trap showed no material superiority over the S-trap. The water, under strong suction, was entirely removed from Nicholson's trap, but its mercury was not, and evidently could not be, disturbed.

7. Mott's "Anti-siphoning" Y-branch of the soil-pipe possesses no material advantage over the ordinary Y-branch.

The general conclusion which naturally follows these deductions would be that the separate ventilation of traps, where the main soil-pipe is 4 inches in diameter and open at the top, is unnecessary, especially as it is generally simpler and much less expensive to carry each waste independently to a branch of the soil-pipe.

I venture the personal opinion that, even disregarding the question of cost, and the increased use of lead pipe, the complication of the work implied by special trap ventilation should be controlling arguments against its adoption.

I publish these deductions as they were originally written. They should be considered only in connection with the different results obtained in Mr. Philbrick's experiments, and the two should have each its proper weight in influencing any decision on the general subject.

I will at a future day communicate the impression on my own mind produced by these two reports taken together, and by the reports of other experiments in the same direction.

GEORGE E. WARING, JR.

GIRDERS. — II.

Case V. Loading uniform over short sections, but which are of different intensities. (Fig. 5.)

IN this case the comparative intensities of the loading are represented by the altitudes of the corresponding rectangles. Commencing at left end, we have a load extending over 4′, of .4 ton per foot; then for 8′, of .3 ton per foot; for 12′, of .5 per foot; and for 4′, .2 ton. These load sections are then divided into short sections of 4′ each, and the areas and weights of each found and

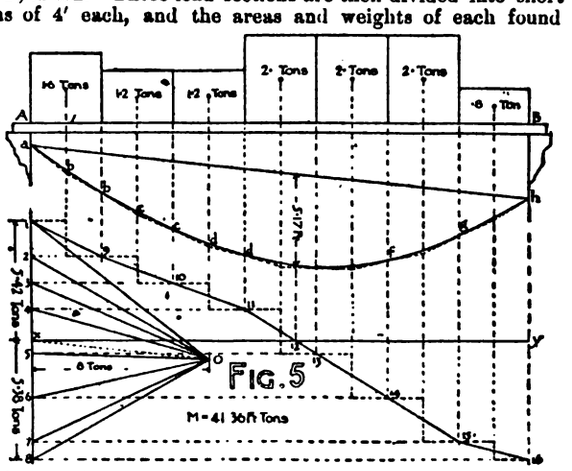

Fig. 5

marked on them. The loads are then laid off in order on the load line, the equilibrium polygon and broken shear line obtained as in the last case.

The equilibrium curve is then found by producing the end verticals of the load sections to intersect the equilibrium polygon and then tracing the curve tangent to the polygon at the intersections. It will here be an irregular curve, but can be readily drawn by means of suitable curved rulers.

The true shear line is obtained by connecting by right lines the intersections of the end verticals and the broken shear line, which produces the broken line 1–9–11–13–14–15–16, the required shear line. Changes of direction occur at the points 9, 11 and 15, which correspond to the changes in the intensities of the loading.

1. The reaction at left end = 5.42 tons = maximum shear; at right end = 5.38 tons.

2. As the true shear line crosses the shear axis at 12, which is 14.9′ from left support, the maximum intercept will also be found at this point, and measures 5.17′. As the pole distance = 8 tons, the maximum bending moment $M = 5.17 \times 8 = 41.36$ foot tons.

Case VI. Load continuous and of varying intensity. (Fig. 6.)

The intensity is assumed to vary uniformly from zero at each end to .5 ton per foot at the centre. The loading is here represented by a triangle, which is divided by verticals into six sections of equal length. The area of each section will evidently equal the product of the half sum of its parallel sides into its length, and represents its weight.

The centres of gravity of the sections will not be at their geometrical centres, but will be found as follows:

1. The centre of gravity of a triangle will lie on the line drawn through either vertex and bisecting the opposite side, at ⅔ its length from the vertex.

2. The centre of gravity of a trapezoid is easily found: join the middle points of its parallel sides by a right line. Produce the first parallel side equal to the second, and the second equal to the first, but in the opposite direction; then join the ends of the produced lines by a right line, and the intersection of this and the line bisecting the parallel sides will be the required centre of gravity of the trapezoid. After obtaining the weights and centres of gravity of the load sections, the equilibrium curve is obtained as before; but the intersections of the broken shear line and the end verticals must be joined by the curved line which will be the true shear line. With a continuous loading of varying inten-

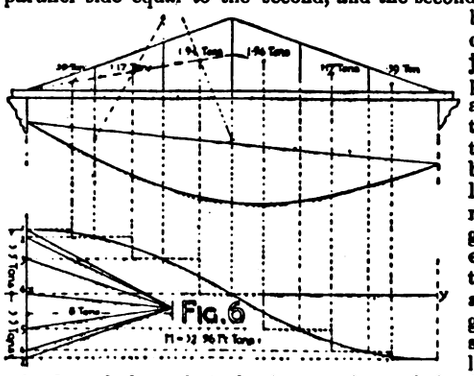

Fig. 6

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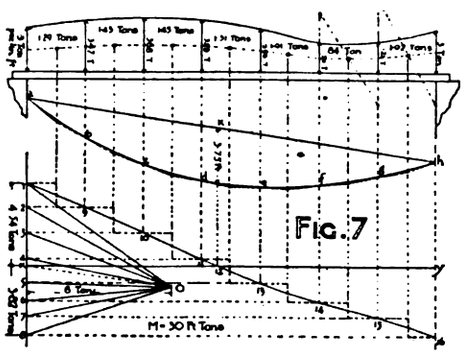
sity this shear line will always be a curve; will be concave towards the shear axis, if the intensity of the loading increases towards the centre of the girder; convex, if the reverse be true.

1. Reactions at ends are equal = 3.5 tons = maximum shear.

2. Maximum intercept is at centre, measures 4.12′; as the pole distance = 8 tons, the maximum bending moment $M = 4.12 \times 8 = 32.96$ foot-tons.

Case VII. Load continuous and of varying intensity. (Fig. 7.) The intensity of the loading is here assumed to vary as the length of the ordinates between girder and the curve above it. The loading is divided in sections of 4′ each, end verticals measured, the areas, weights and centres of gravity of the load sections obtained by the methods employed in the last case. The equilibrium and shear curves then offer no difficulty.

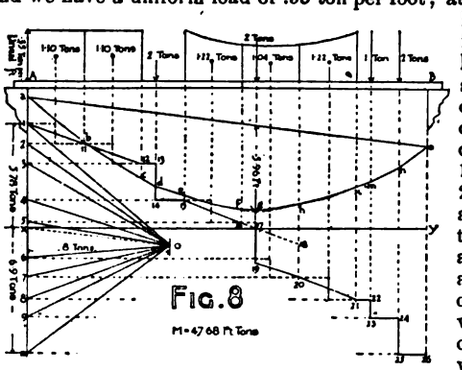


1. Reaction at left end = 4.54 tons = maximum shear; at right = 3.82 tons.

2. The shear curve crosses the shear axis at 12.9′ from left end, consequently the maximum intercept is found at that point, and measures 3.75′. As the pole distance = 8 tons, the maximum bending moment = $3.75 \times 8 = 30$ foot-tons.

Case VIII. Loading of mixed character. (Fig. 8.)

As a combination of all possible forms, the loading is assumed to be arranged as shown in the figure. For a distance of 8′ from left end we have a uniform load of .35 ton per foot; at 9′, a concentrated load of 2 tons; from 11′ to 23′, a load of an intensity varying as the ordinates to the curve; also, concentrated loads at 16′, of 2 tons; at 24′, 1 ton; and at 26′, 2 tons. Portions of the girder are not loaded at all. The continuous loading is divided into sections, of which the areas, weights and centres of gravity are then found. The equilibrium polygon and broken shear line are then obtained as in *Case V.* The equilibrium curve will only be traced under the continuous loading, the remainder being formed by the polygon first found, so that we have a mixed equilibrium curve and polygon, and the intercepts must be measured accordingly.



For the first 8′ from the left end the true shear line will be the inclined straight line 1–11–12; then from 8′ to 11′, the broken line 12–13–14–15. If the load of two tons at 16′ were removed, the point 20 would fall at 18, the distance 20–18 being = 2 tons; trace the curve 15–16–18; make 17–19 = 2 tons and trace the curve 19–20–21. The true shear line will therefore be the mixed line 1–11–12–13–14–15–16–17–19–20–21–22–23–24–25–26.

1. Reaction at left end = 5.78 tons; at right = 6.9 tons = maximum shearing strain.

2. As the true shear line crosses the axis at 16′ from left end, the maximum intercept is found there and measures 5.96′. As the pole distance is 8 tons, the maximum bending moment $M = 5.96 \times 8 = 47.68$ foot-tons.

Since the preceding examples may be made to cover all possible modes of arrangement of a fixed loading, it is evident that the general problem of obtaining the bending moment and shearing strain, acting at any point of a girder, and caused by any arrangement of the load, has been completely solved.

(*To be continued.*)

Perranzabuloe's Church. — Most people have heard of the church at Perranzabuloe, which for centuries was "drowned with the sea sande," and most people will have read with surprise the statements in this month's *Antiquary* that it is in danger of total destruction from tourists. The church was discovered in 1835, and was at once visited by numerous controversialists who endeavored to prove from the remains the existence in England of a Protestant church nine hundred years before the restoration, and by the bands of strangers who took away pieces of the building as relics. Religious disputants no longer make their way thither (or, if they do, they refrain from publishing their theories), but the danger from tourists seems to continue unchecked. Cornwall is out of the range of Sir John Lubbock's bill, but is there not an antiquarian society in Cornwall which might look after such monuments of the past? — *Pall Mall Gazette.*

THE ILLUSTRATIONS.

WROUGHT-IRON GRILLE OF THE MILLS BUILDING, NEW YORK, N. Y. MR. GEORGE B. POST, ARCHITECT, NEW YORK, N. Y.

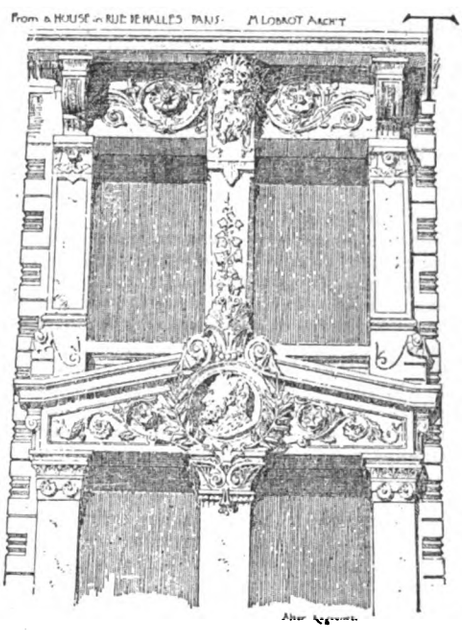
THIS wrought-iron grille is at the main entrance of the Mills Building on Broad Street, and was executed by J. B. & J. M. Cornell of New York. The width is 25′ 6″, and the height 15′ 5½″. The sizes of iron vary from ⅛″ x ¾″ to 1″ x 4″. Seven men were occupied a little more than three months in its manufacture. The weight is 11,055 pounds, and it is raised and lowered by two hydraulic rams. When raised the arch of the gate meets the arch of the stone-work of the entrance.

BLOCK OF HOUSES, CHICAGO, ILL. MESSRS. BURNHAM & ROOT, ARCHITECTS, CHICAGO, ILL.

SKETCH FOR PART OF A COUNTRY HOUSE. MR. H. P. KIRBY, ARCHITECT, PITTSBURGH, PA.

HOUSE FOR G. F. ELY, ESQ., CLEVELAND, O. MR. W. A. BATES, ARCHITECT, NEW YORK, N. Y.

RECENT BUILDING IN BALTIMORE.



THE past year has been noted for the large number of important structures erected in this city. The largest, most pretentious, and most expensive building, now nearing completion, is the central office of the Baltimore & Ohio Railroad Company. It covers a site 100′ x 100′ in the business centre of the city, and is seven stories high, including a two-story mansard roof. The first story is of fine hammered granite, the others of red brick and dark bluestone. Panels of terra-cotta are used below the windows, in the brick dormers, and in the main piers. The color of the entire mass is dark, while the second tier of dormers, the angles of the roof, and the elaborate cornice at its top, are colored in two shades of very light brown; the lighter exactly the tint of the yellow terra-cotta cresting, crowning the black slate roof. The main entrance is marked by a projecting granite pier on either side; each having a sculptured car-wheel on its face, and carrying two polished granite columns, the whole surmounted by a vast flat-topped superstructure of bluestone, having a segmental arch below, and seemingly about to crush the slender shafts beneath. The entire construction extends through two high stories. Under this, in the face of the wall, is a high and narrow round-headed opening, with the upper portion filled by a double arch, forming a transom. Below this is the doorway proper, hardly occupying one-fourth the width of the entire construction. The windows are square and round-arched in alternate stories, the fifth having mullion shafts of polished granite. The carving, of which there is considerable, is distributed over the entire building, as large rosettes, and as capitals to brick window-piers, which are generally continued as string-courses, though in the third story the line of stone caps is continued on the walls by a band of flat terra-cotta tiles. The effect of the building is massive, until dispelled by the fanciful coloring of the roof work. The execution of the work of the exterior is apparently faultless. The architect is Mr. E. F. Baldwin. An immense telegraph pole, nearly two feet in diameter, has been planted opposite the main angle of the building, and painted a spotless white, with what effect can be imagined.

The new Chamber of Commerce, now receiving the finishing touches, is 85′ x 186′, and 90′ high. It is of red brick and fine white granite, the whole surmounted by an immense galvanized-iron cornice, painted to imitate granite. Three floors contain about sixty offices, while the fourth comprises the hall for the use of the Corn and Flour Exchange. This hall is 76′ 6″ x 147′, and 40′ high. The building is covered by a low roof, not visible, except from a distance. The ridge, with an eye to utility rather than beauty, is crowned by a fence of iron pipe, containing insulators for 860 telegraph wires. These are grouped into cables and carried to the hall below. The openings of the lower stories are all square-headed, with flush granite lintels, forming horizontal bands. On the second floor this is broken by projecting red terra-cotta work of *Gothic* design. The windows of the large hall have round-arched heads. The openings

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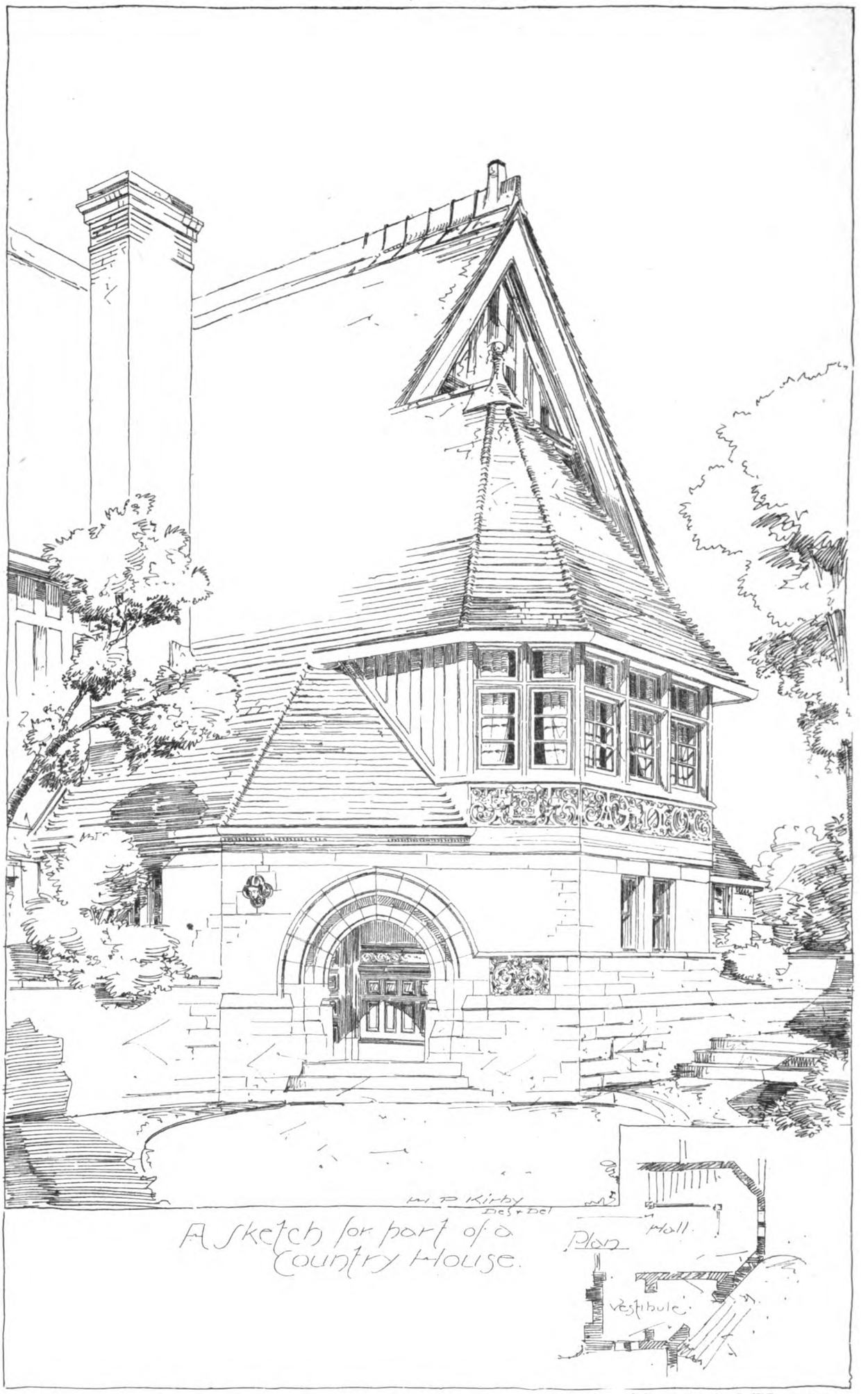

A Sketch for part of a Country House.

Heliotype Printing Co. 211 Tremont St. Boston.

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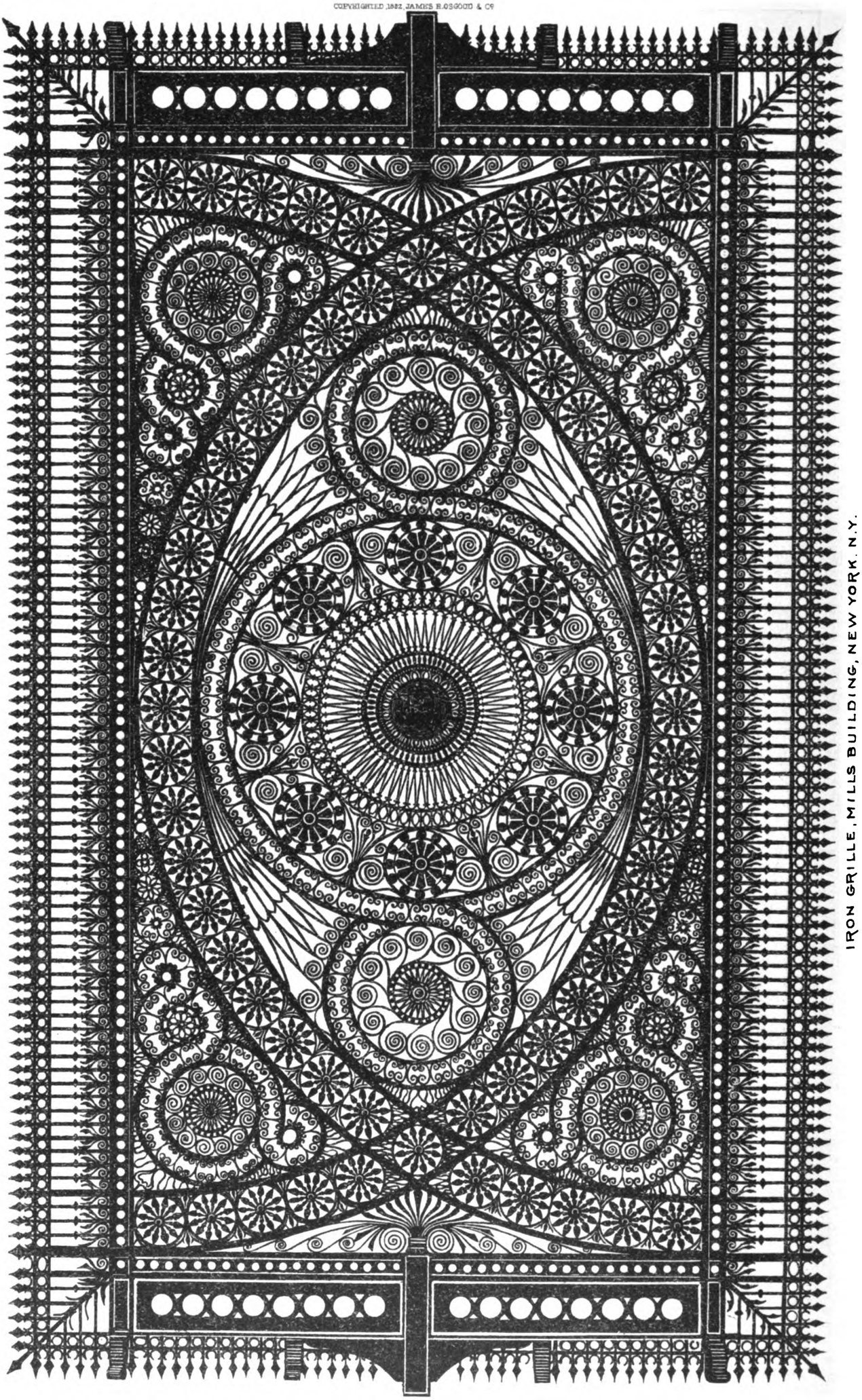

IRON GRILLE, MILLS BUILDING, NEW YORK, N.Y.
GEO. B. POST, ARCHITECT.

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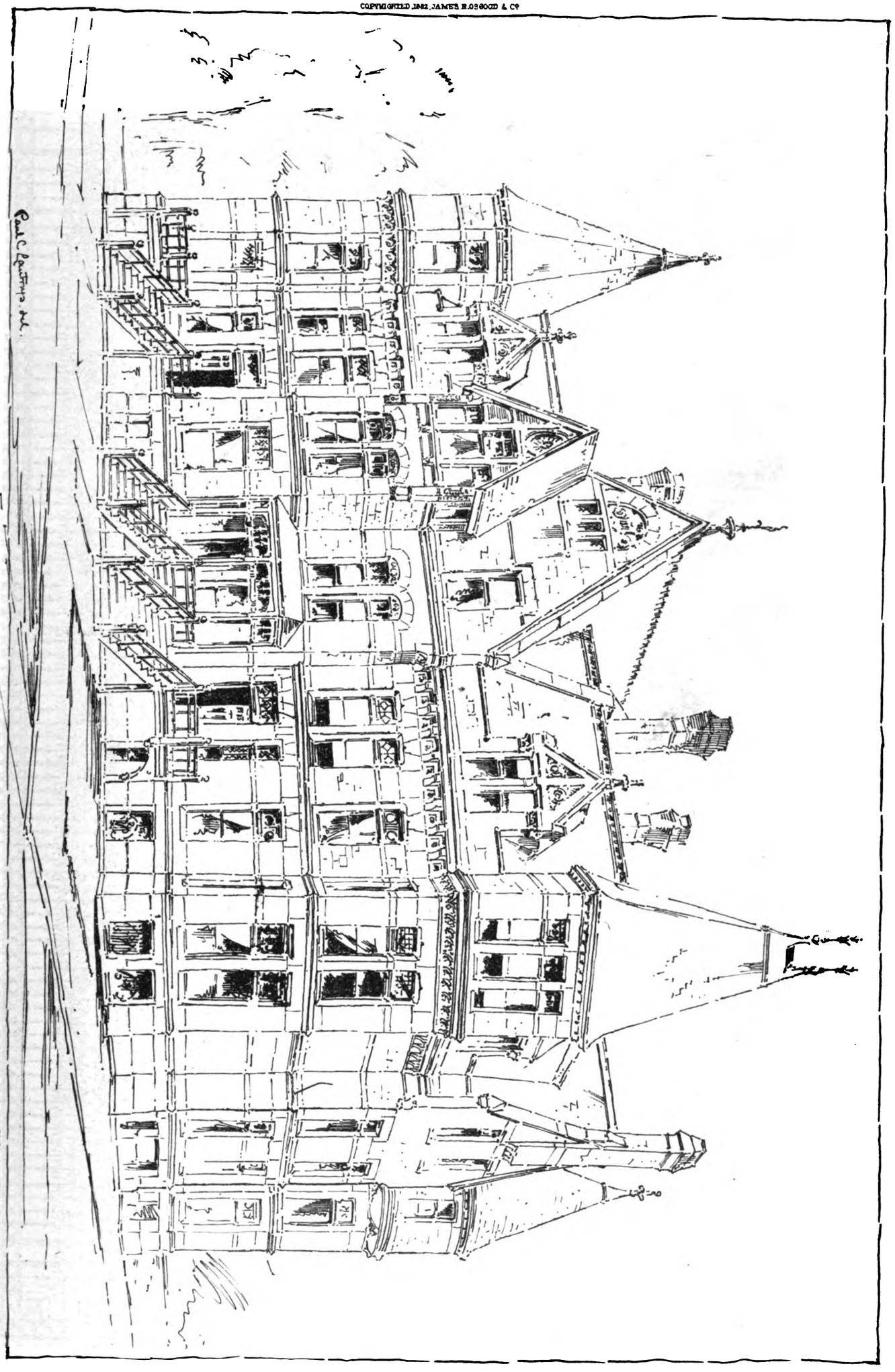

Block of Houses, Chicago, Ill.

Burnham & Root, Architects.

Heliotype Printing Co. 211 Tremont St. Boston.

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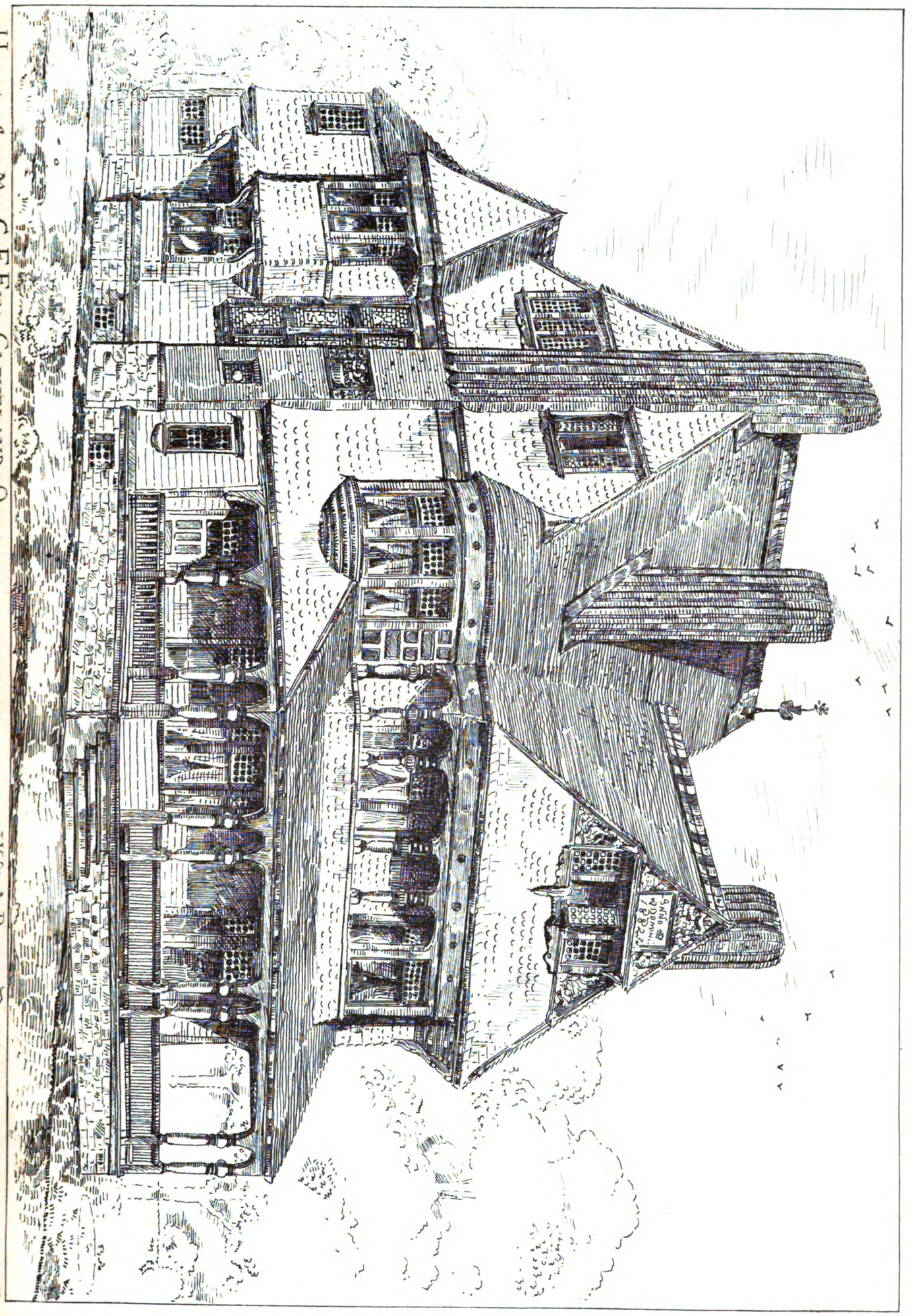

House for Mr. C. F. Ely Cleveland O.

Wm. A. Bates Architect 149 Broadway New York

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are exactly over each other everywhere, and the tiresome monotony of horizontal and vertical lines is only broken by a peculiar construction over the main doorway, built up with solid piers and polished columns, and covered by an arch over which the line of the third-floor cornice is awkwardly bent, to resume the even tenor of its way on the other side. The architect is Mr. J. R. Niernsée.

The Pratt Free Library Building, having a white marble façade of 87 feet on Mulberry Street, is half completed. It has round-arch openings, Gothic carving and numerous polished columns, and will cost $225,000, and have shelving for 200,000 volumes. Mr. C. L. Carson, architect.

The new Post-Office has the foundations well advanced, and the setting of basement granite is progressing.

The new Merchants' Club-House will be opened on September 11. Its front on German Street, with four stories of red brick, and blue-stone sills and band courses, is almost devoid of architectural design. The kitchen department is in the upper floor, separated from the others by fire-proofing.

Mr. W. T. Walters is building an annex to his picture gallery, connected with it by a bridge, and entirely fire-proof. His collection is not surpassed by any of equal size in the United States.

The Trustees of the Johns Hopkins University have purchased ground in the rear of what have been considered the temporary buildings, on Howard Street, giving an unbroken site for an entire block, to Eutaw Street. They are adding to the chemical laboratory, and have begun the erection of a biological building. This would seem to indicate the abandonment of the magnificent site reserved for the University by its founder, just beyond the northeastern boundary, and a permanent location in the city. Such a course was resisted by a number of the trustees, as utterly opposed to the spirit, if not indeed to the letter, of Mr. Hopkins's will, but, apparently in the minority, they have been over ruled.

A large building for the City Insane Asylum is nearly completed at Bayview, in the eastern suburbs. Mr. F. E. Davis, architect.

The new Western Bank is almost ready for occupancy, and will be the most thoroughly constructed of any in the city. Its materials are pressed brick with elaborate ornamentation in Cheat River blue and Scotch red stone. It is one high story, with Directors' room, etc., in an annex of two lower stories. A notable exception to the usual wretched carving here can be found in two small pediments just executed in the new Trader's Bank, on German Street. It is Renaissance in detail, and exquisitely cut. We trust it may lead to better work in the future.

Quite a number of warehouses have been built during the past year. Two of the most prominent now unfinished are one for Mr. A. Gottschalk, of iron, brick and Hummellstown brownstone, Mr. G. A. Frederick, architect; and two for Mr. Gaither, Mr. J. C. Gott, architect. The latter are six stories high, and remarkable for the use of a horizontal, decorated band of brickwork at the line of every alternate floor, the construction being otherwise entirely of iron, except narrow piers opposite the side and division walls. Mr. T. C. Kennedy has just completed a Congregational church on Eutaw Place. It is an octagon on plan, with open roof-trusses meeting over the centre of the auditorium. The materials are hammered gray gneiss and red Scotch stone. The roof is of black slate, surmounted by a small ventilating turret covered with lead: the finials, hips, etc., being of the same material in its natural color. Mr. Carson has two Methodist churches, one of which, the "Strawbridge," is completed, and is one of the most picturesque designs in the city, both for grouping and color. It is of gray gneiss and red sandstone; spire and roof covered with black slate. The "Epworth" is of red brick in red mortar, and relieved with red stone and terra-cotta; the openings are round-arched and the tower has a tall pyramidal roof of black slate. The First Presbyterian Church, designed by N. G. Starkweather in 1855, is undergoing some changes in the plumbing and ventilation of its chapel. It has probably the highest and most elaborate spire in the United States, measuring 32 feet square and 298 feet high, constructed entirely of New Brunswick sandstone, richly carved. The internal arrangements of the church were, however, so faulty that neither a flue nor a water-closet was to be found, the chapel being heated by stoves having their funnels thrust through the windows!

Quite a number of dwellings are building in the northern part of the city. That of Mr. Ross Winans, by McKim, Meade & White of New York, is probably the most costly and elaborate residence ever erected here. The exterior is of brick and Longmeadow stone; the stairway-tower is elaborately carved and covered by a conical roof. The whole mass is plain, almost to severity, and has a simple, double-pitched, high, slated roof. The house is surrounded by a garden below the street grade, and enclosed by a wall. Against the east side of this wall is a fountain, the water issuing from the mouths of dolphins and falling into a carved stone basin, semi-circular on plan. The interior of this house will be elaborately fitted up in natural woods, the hall and staircase being of oak. Messrs. Wyatt & Sperry are just completing a block of twenty-three houses, for Rev. R. A. McKim of New York, on Calvert Street, opposite the block built last season by J. A. & W. T. Wilson, for Mrs. C. L. McKim. This square is now the handsomest, architecturally, of any in the city. The new houses are brick, with red sandstone largely used. One square beyond, Mr. C. E. Cassell has just erected a dwelling, of rough marble, for Mr. Solomon Corner; while directly opposite, Messrs. J. A. & W. T. Wilson are erecting a residence for Mr. Charles Rous, of sand-brick and Goldsboro' brownstone. This house is unique in the fact that the partitions will be of hollow blocks of Hydraulic Lime of Teil concrete and entirely fire-proof. A new parsonage for the Brown Memorial Church has lately been finished, from the designs of Mr. E. G. Lind. It is of rough marble, like the church, and the doorway is ornamented by a shield, which, owing probably to the ignorance of the stone-cutter, is decorated with a bar sinister! Mr. Lind, who is the President of the Baltimore Chapter A. I. A., and the designer of many important buildings here, has permanently removed to Atlanta, Ga. Owing to the fact that no building laws are in force here, the construction of the numerous speculative "rows" of houses, put up chiefly in the western part of the city, is past belief. Most of them are divided from each other by 4″ brick walls (?), have joists 2″ x 8″ spaced two feet apart, and the rest in proportion. Heaven help the occupants; for the plumbing is of the same character, most of them having a leaching cesspool for the common use of each pair, generally located twenty feet from the rear wall, and with unventilated soil-pipes terminating in the house. Diphtheria has lately prevailed to an alarming extent among them. The city has no system of sewerage, and a committee lately appointed has presented a comprehensive report advocating the "separate" system so successful at Memphis and elsewhere. No action has yet been taken in the adoption of the report, however. Showing the public ignorance on the subject, one of the city papers recently quoted several towns having "improved sewerage," remarking that "diphtheria and typhoid fever prevailed to a vast extent in each, and closed by saying "The Baltimore surface drainage and sink system is better after all!"

There is a growing tendency to fire-proof construction, nearly all the important buildings lately erected being so constructed. So far there is not an example of carved brickwork in the city. As we have probably the finest material in the world for this purpose, it is hoped that before long it may be availed of.

THE DRAUGHT OF CHIMNEYS.

THE attention of the Mathematical and Physical Section of the British Association was, on the 30th of August, called by their president, Lord Rayleigh, to the very humble practical inquiry[1] as to the effect of wind on the draught of chimneys. It would be difficult more aptly to illustrate the true connection between the pursuit of pure science, and the most every-day annoyances of domestic life (with a view to the removal of the latter), than is afforded by this announcement. As a prime feature in the architecture of dwelling-houses the chimney demands a chapter to itself. And it is well that the basis of this chapter should be mathematical. With regard to draught, we have more than once had occasion to remark that it is a function of the height of the chimney-tubes. We do not, of course, apply the remark without modification to the details of ill-constructed chimneys. Many chimneys smoke from positive ill-construction, having a narrow part, an ugly bend, or a downward portion, in their conduit, which the normal draught is not strong enough to overcome. Others smoke because they form the shortest channel by which air can enter the house to supply the draught of the loftier chimneys. Where there are two chimneys in one room, and the doors and windows are closed, lighting a fire in one chimney will ordinarily cause down-draught in the other, as the readiest mode of maintaining the atmospheric equilibrium. In most cases, however, the addition of a yard or so to the height of the chimney-stack, supposing that to be already above the highest part of the interior of the house which it ventilates, will prove more useful than the addition of any of those curiously contorted and wholly non-pneumatic contrivances, the endless variety of which tortures the eye of the mechanically-minded man as he whirls along the suburban railways.

Apart from the questions of normal draught, and of internal regularity of construction, is the effect of wind on the draught of chimneys. This varies very much with the locality of the house. It may be said to be primarily a question of site. Neither is it a question always to be settled, *à priori*, by the architect. The action of wind, although, of course, always determined by physical laws, is so subtle, and so delicately affected by slight causes, that there are cases in which it is all but impossible to foretell it. What is more com-

[1] A formula and table for chimney draught.

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mon than to have a chimney that answers perfectly well except when the wind is in one particular point of the compass? And why does it then smoke? To be able to reply to this question is to be able to cure the defect; but how often is the difficulty regarded as insuperable? It may be useful to cite an instance of the deflection of wind in a manner that it is difficult to explain, and that could certainly never have been anticipated. On the lovely plain of Sorrento, sloping towards the Bay of Naples, in the midst of its own gardens and orange groves, stands a stately palace, which, in the days when the name of Nelson was a terror on the seas, was a favorite haunt of the Queen of Naples, and was not unfamiliar to our great sea-captain. There are no rocks, lofty buildings, or overhanging trees in the immediate vicinity, and nothing that is apparently likely to interfere with the free movement of the wind, from whatever quarter it may blow. The aspect of the front of the palace is northerly, looking over the Bay towards Naples, and the hills behind it. On a few occasions — some three or four times, perhaps, in the year — a strong east wind sweeps across the peninsula, and is clearly indicated as to its course by the straight and level stream of smoke that it drives from the cone of Vesuvius across the bay. But on these occasions, the current is so deflected by the northern shores of the bay, fully twenty miles distant, as to drive on the front of the palace: that is to say, in a direction pointing nearly due north, with such force that it becomes necessary to close the *persiani*, or outer window-shutters, in order to preserve the great drawing-room windows from being blown bodily in. Full familiarity with the spot does not afford any very satisfactory explanation of the phenomena, of which, however, we can speak from repeated personal observation.

This, perhaps, may be regarded as an extreme case. Nevertheless, it is typical of not a few instances in which currents may be detected after a house is built, the existence and effect of which the architect cannot be blamed for not having foreseen, but the influence of which on the draught of his chimneys will be, for so many days in the year, at once irresistible and intolerable. There is now absolutely nothing for it, in such a case, but to put out the fires. We do not say that a cowl may not be of use, but, on the other hand, we cannot speak from any experience of the action of a cowl under such conditions.

Here, then, comes in the scientific part of the question as attacked by Lord Rayleigh. What is the effect of a cross current of wind on the draught of a chimney? As the direction of the wind is more and more downward, his lordship replies the up-draught of the chimney diminishes, but does not turn backwards, that is to say, become down-draught, until the inclination amounts to about 30°. This is an important point at which to arrive. It is, however, obviously necessary to ascertain the precise features of the cases where the experiments were made, before formulating any absolute rule on the subject. The height of the top of the chimney, both above the sea-level and above the basement of the house, is one fact needful to determine. The force of the wind is another. Thus, a wind of the velocity of ten or twenty miles an hour blowing downwards at a measured angle would produce a very different effect on the draught of a chimney 40 feet high from that which it would have on the draught of a chimney 100 feet high.

Again, the maximum up-draught, we are told, is not with a direction of wind vertically upward, but with one making an angle of about 30° with the vertical. This is a result which it is without our experience either to confirm or to question. But it is clear that the cases must be extremely rare, if ever they occur, in which the top of a chimney would be exposed to a wind blowing upwards at a more acute angle than 30°. The determination of the same angle as the limit of downward and of upward efficiency is as elegant as it is unexpected.

A yet more practical part of the subject is the remark of Lord Rayleigh, that "a chimney with a T-piece at the top never produced an unfavorable effect on the up-draught, and only in one case failed to produce a favorable one." Professor de Chaumont thought vertical ends would increase resistance to the up-draught. So do ninety-nine people out of a hundred. We have no hesitation in saying that Lord Rayleigh is right, and that general opinion is wrong, provided, that is to say, that the protection of the chimney-top be rightly designed. And we say this absolutely and unhesitatingly, because our judgment is based on the two independent and concurrent sources of evidence afforded by observation and by direct experiment. In Southern Italy chimneys, no doubt, are comparatively few, but they exist in many buildings, and no Italian architect would dream of leaving a vertical flue or pipe open at the top to receive the tremendous downpour of rain which occasionally occurs in Italy with almost tropical violence. The aperture of the chimney is always roofed over, the smoke escaping by side apertures. The practice of the master-builders of the world is thus in accordance with the theory of the English scientific noble in this respect.

Experience, we have said, confirms the remark. And here, if we seem for a moment to depart from an admirable rule,—that of not mentioning in a scientific paper anything that may look like an advertisement,—we must explain that such appearance is deceptive. We have to refer to an admirable invention which was made and sold some forty years ago under the name of Day's Patent Wind-Guard. As to the validity of the patent it is not needful now to inquire, as in any case it must have long since expired. But what we lament is, that, so far as we can discover, this admirable invention has been entirely forgotten. In recent inquiries which we have instituted in order to obtain one of these wind-guards for our own use, we have been unable to discover that they are now made, although figured in some old trade-books. It may, therefore, be of much use to give such particulars as will guide any one in constructing an appliance of the kind.

Let us take, for example, the case of a chimney, two bricks and a half, or 22½ inches square, with a flue of 9 inches square. A frame is to be constructed which would lie upon this hollow square, and allow bricks to be built on it to the height requisite to hold it steady. From this frame the guard itself rises as an octagonal shaft. Four pieces of sheet-iron, or of slate, each 9 inches wide and 18 inches high, are fixed on the lower frame, 16 inches apart, so as to form four sides of an octagon, and the other four sides are formed of four similar plates, set at angles of 45° with the former, but so much within them as to allow 1½ inches to 2 inches clearance between the edges. These inner plates will just touch the outer angle of the 9-inch flue. A top, of iron or of stone, holds the upright plates together, and both top-plate and base-plate may be finished with a simple moulding. Sheet-iron is perhaps the best material, but it is obvious that the contrivance may be made also in slate.

As to the perfect security which this guard effects from wind, we can speak not only from the testimony of those who have used the plan, but from careful experiment. With models of the wind-guard made on the scale of 1 inch to a foot, set on small tubes of proportionate size, representing chimneys, which were fed with smoke from the combustion of paper, we have experimented by means of powerful jets of wind driven in various lines of force; vertically downwards on the top of the guard, horizontally at right angles to either side or angle, or in any other direction. In no case have we found it possible to produce down-draught in the chimney by the force of wind. On the contrary, the greater the force the better the draught of the chimney.

The *rationale* of this action may be illustrated by that of a much later invention, now in common use on our railways, — the steam injector. Let those of our readers who desire to master the subject, and have no more ready mode of doing so, refer to the diagram and description of this appliance which is given by Sir F. J. Bramwell, on p. 335 of a work recently published by Messrs. Longmans, under the title "Railways and Locomotives." It will there be seen that "steam, escaping at high velocity through a circular orifice, induces a current in a body of water in connection with that orifice, and carries it forward, at the less velocity corresponding to the increased weights of the combined stream of water and steam, but still at a high velocity." This stream passes into an expanding channel, where its velocity is further reduced, and so into the boiler, which is thus fed with water.

In the case of the wind-guard, the wind striking on the outer plate causes a current of proportional velocity between the edges of the outer and inner plates, and thus creates an induced current, which comes in aid of the draught of the chimney. The difficulty to be overcome is far less than in the case of the two fluids of unequal specific gravity; but the effect is so much the more powerful. We are familiar with the contrivance mentioned by Professor de Chaumont, which has been used for the protection of lamps from the dash and spray of sea, as we believe, with admirable results. But it is a much more complicated, and therefore more costly, contrivance than the very simple one which we have endeavored to rescue from oblivion. And we think that it is purely protective in its action, while the construction that we describe is not only protective but absolutely aids the up-draught; and, moreover, the cone is more likely to become choked with soot. The brush of the sweep can easily ascend into the interior of the wind-guard, in case of any soot lodging there.

We have little doubt that any enterprising manufacturer who will discover one of these old wind-guards (they were made and sold somewhere in Pimlico, in 1842), make some to pattern, and introduce them to the trade, will at the same time do a good stroke of business, and confer a very great benefit, both on the architect who has to build in exposed and gusty situations, and on many a householder who now knows too well, and that to his cost, when the wind is in the east, or in that quarter, wherever it may be, that is hostile to the good behavior of one or more of his chimneys.

We are not acquainted with any mathematical formulas intended for the guidance of the architect as to the height or draught of chimneys. It may, therefore, be of some service to provide a simple table for the use of the architect and of the builder, stating, in the first instance, the principles on which it is calculated.

The only cause of that upward movement which we call the draught of a chimney is the difference between the weight of the column of air and vapor in the shaft, and that of a column of equal height of the exterior atmosphere. This difference of weight must be enough to overcome the friction within the chimney-shaft and any resistance to free discharge at the top. It is obvious that the ascending volume consists of matter which, at equal temperatures, is heavier than atmospheric air, as it contains soot, or finely comminuted carbon, carbonic acid, sulphur, and other matters naturally heavier than air. Calling attention to the existence of these two sources of retardation, viz.: friction and the loading of the column, it will be safe to neglect them in tabulation, as it is very difficult to determine the absolute heat of the ascending column, and a few de-

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grees more or less will amount to quite as much as the elements thus neglected. With this explanation the formula that regulates draught may be thus stated:—

$$D = (a.t.—a.t'.)\ h.$$

where D = the draught, $a.t.$ the weight of a cubic foot of atmospheric air at the external temperature, and $a.t'.$ the weight of a cubic foot of atmospheric air at the mean temperature within the shaft, and h the height of the chimney. It is obvious from a glance at this formula of how much importance the addition of a very few feet to the height of a chimney must be.

To increase the draught we must increase either h, the height of the chimney, or t', the temperature of its contents. This explains at once the efficacy of the best appliances for increasing draught,—such as the bi-valvular registers, in this country, and the iron blind that is drawn down within the chimney aperture in the wood-burning fire-places of France and of Belgium. The larger the aperture below,—the greater the quantity of cool air that enters the chimney,—the lower is t', and the less the draught. The more the air that enters below is compelled to pass through in close proximity with the burning fuel, the higher does t' become, and the more powerful the draught. This is the simple key to the whole theory and practice of draught produced by heat. Of course, in different conditions of the barometric column equal amounts of heat will have somewhat different effects. Hence we can see in a moment why our fires should "draw" so much better in clear cold weather than when the air is warm, or loaded with damp. The weight of a cubic foot of air at 32° Fahrenheit is 0.080728 lb. avoirdupois.

If the top of a chimney-flue were closed by a flap, or hinged valve (the weight of which we take as counterbalanced), the effect of the draught, or rather of the downward pressure of the external atmosphere which causes the upward draught, would be to lift the valve in proportion to the force of the current. If at the same time a strong wind be blowing over the top of the chimney (in the direction of the hinged end of the flap) its effect would be to force down and close the valve. The stronger current of the two will obtain the mastery to the degree of its excess of pressure. This is also the effect, it will be seen, of cross-current where there is no valve, but where the two currents more or less interfere with the movement of one another in the way shown by the action of the valve.

It is possible wholly to eliminate the ill effects of this cross-current, and even to utilize it in aid of draught, by any contrivance that causes the external blast to produce an induced current from within the chimney; and this, it is easy to see, is the effect of the wind-guard.

In calculating the following table we purposely use round and approximate figures, as quite sufficiently accurate for practical purposes, and as more readily intelligible to many readers than more complicated mathematical expressions. We have also used the pressures proportionate to velocity as allowed by Smeaton. Now, assuming, for convenience of calculation, an increase of temperature of 108° Fahrenheit (that is, from 62° to 170°), as imparted by a fire to the ascending column of air that passes over it up the chimney, we shall have an upward pressure of a fraction over 0.04 lb. for every foot of ascent in the shaft. This is represented in the following table of comparative heights of chimney, pressures, and velocities of current, calculated for that rise of temperature.

It will be proper in making use of this table to refer to the table (III.) given in a former article, showing the increase of velocity of the wind with the height obtained above the ground. Thus in rising from 15 feet to 50 feet there is, as shown on that table, an increase in the local velocity of the same wind from 60 to 70.8 miles per hour. In raising a chimney from 15 feet to 50 feet we should obtain an increase of draught-pressure of from 0.6 lb. to 2.0 lbs. per foot, as against an increase of wind-pressure, in a great storm, of from 20 lbs. to 27 lbs. per foot. The gain is more than threefold,—the loss less than 33 per cent. We mention this not as a difficulty, but to show that proper consideration must be given to the whole subject.

TABLE FOR CALCULATION OF CHIMNEY-DRAUGHT.

Height of Chimney in feet.	Pressure due to 116° Fah. in lbs. per foot.	Velocity of draught in miles per hour.
30	1.2	16
40	1.6	18
50	2.0	20
60	2.4	22
78	2.8	24
90	3.2	26

It is, of course, apparent that if we have an ordinary fireplace, with a chimney 50 feet high, and with that proportion of fuel and of draught which gives a current of twenty miles an hour to the ascending column of smoke, the aperture at the top of the chimney would be closed by a cross-current blowing at the rate of seventy miles an hour almost as efficiently as by a valve weighted to 27 lbs. per foot. The fire, in fact, would have to be extinguished. But the pressure of 27 lbs. per foot, or 0.19 lb. per inch, is very trifling in comparison to the pressure of steam in a boiler; and as the action of the injector by induced current is an ascertained fact, it is plain that it is within the province of the engineer to make the hurricane, blow it ever so wildly, produce an induced current through a chimney, so that the draught shall in no way be reversed by storms. As to that there can be no doubt, although this may be the first time that the statement has been definitely made. We have given what our own experience has led us to believe to be a simple and effective means of producing this induced current. If any of our readers can recommend a better plan we shall be happy to make it known.

We had put on paper some remarks on one or two other matters discussed at the British Association, which appeared to us of striking industrial importance; but the novelty of a scientific investigation of a subject which most men are accustomed to regard with a hopeless shrug of the shoulder, as well as the importance of a thorough appreciation of a matter which comes so directly home to every householder and to every house-builder, is such that we have thought it well to devote to this question of draught all the space at present available. We think it cannot be too strongly insisted on that when, first, the subject of up-draught, and secondly, that of wind-protection,—or rather, wind-induced draught,—are seen to be thoroughly within the control of science, it will be felt to be unpardonable to be condemned to the great nuisance of a smoky chimney.—*The Builder.*

THE ALBANY CAPITOL.

THE special commission appointed to examine the new Capitol, particularly the Assembly Chamber, have submitted the result of their investigations to Governor Cornell, and recommend that the vaulted stone ceiling in that chamber be taken down and replaced by a wooden construction. This change cannot be effected except by order of the Legislature. Following is the report in full:

To the Hon. Alonzo B. Cornell, Governor of the State of New York:

SIR: The undersigned Commissioners, appointed by you to "survey and examine the different parts of the new Capitol, as to the safety and durability of the work, more especially as concerning the Assembly Chamber and the ceiling thereof," have the honor to report as follows:

Immediately upon the organization of the commission we proceeded to get as correct an idea of the present condition of the Capitol as could be acquired from, first, an examination of the building, and the explanation of Major J. W. Eaton, the local Superintendent, who has been in charge of the work almost from its commencement, and a careful study of such drawings as were in his possession; second, from reports of sundry surveys and levels taken at various times by Mr. R. H. Bingham, City Surveyor; third, from the explanations of Mr. Leopold Eidlitz, who represented the architects in charge of the work.

As the result of these investigations we find that the materials and workmanship of the building in general are exceptionally good, and we discover no defects worthy of special consideration other than those appearing in the Assembly Chamber and the portions of the building immediately above and below it. We have consequently confined our subsequent labors to a very careful and, we believe, thorough examination of these defects; to an analysis of their causes, and to a consideration of their bearing upon the ultimate stability of the structure. To this end we caused a new set of levels to be taken, from which it appears that, although no very unusual amount of settlement has occurred, the settlement has not been uniform.

The footing courses directly under the large granite columns which carry the vaulted roof of the Assembly Chamber were uncovered for inspection, and we find that the piers resting on them have settled more than the adjacent walls, and that there is a difference in settlement between the piers themselves.

Scaffolds were swung under the vaulting of the Assembly Chamber so that it could be minutely examined. We find that one of the main diagonal or groin ribs is seriously cracked, and also the portions of the vaulting surface that rest directly upon it; that the end walls over the main transverse arches are somewhat out of place, and that the main side vaults are in bad condition.

We have had the entire vaulting, with its supports and backing, measured, and their weights carefully computed, as a check to the accuracy of the quantities furnished to us by the architect, and we find that his calculations are substantially correct.

We have had the main granite shafts in the Assembly Chamber plumbed, and find that one of them is slightly out of plumb, leaning in the direction of the plane containing the line of the resultant of the thrusts of the groined vaulting and the arches sustaining it.

We have tested the stone of which the ribs of the vaulted ceiling are constructed, and find that it is not uniform in quality or strength.

We have examined the plans of the foundations of the building which were prepared by Mr. J. W. McAlpine, civil engineer, to carry the superstructure designed by Mr. Thomas Fuller, the architect, under whose direction the masonry of this part of the building was carried up to about the level of the second floor. We conferred

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also with Mr. McAlpine in person, and examined his printed report on the foundations, in order to gain a full knowledge of the subject. We find that the foundations under the four main columns of the Assembly Chamber are, under the most favorable view of the distribution of the pressures, loaded to the extreme limit of safety. We discover that after Mr. Fuller was superseded by Messrs. Eidlitz, Richardson and Olmstead, the plan of the Assembly Chamber was altered to such a degree that the weights on the foundations under the four great piers are very much greater than those foundations were designed to carry, and in consequence an unequal settlement has occurred. This, however, in itself is not, in our opinion, sufficient to imperil the safety of the structure. The evidence is strong, though not conclusive, that the settlement has ceased.

We have critically examined the plans of Mr. Leopold Eidlitz, architect, for the construction of the Assembly Chamber and the work connected with it, and have given due consideration to his very full and clear explanations of his computations and methods of construction.

We have constructed lines of pressure for the main arches and vaulting ribs, and have made such other computations as were necessary for analyzing the strains on the different parts and comparing the results with the devices arranged to resist the strain.

The side vaults as above referred to as being in bad condition have a decided tendency to rise at the crown, and the stones of which they are composed are crimping and cracking in various places. The main longitudinal and transverse arches are in safe condition. The thrust of the various arches and ribs is transferred to half-arches, resembling flying buttresses, lying in the prolonged planes of the longitudinal and transverse arches, and thus transferred the thrust is itself taken up, at points above the crowns of the main arches, by iron rods. Provision is made for maintaining a uniform temperature of these rods by inclosing them in masonry boxes, and by heating the attic through which they run.

If we could be sure that this unequal settlement of the foundations has permanently ceased, and that they were capable of safely bearing an increased load, and that the present mixed construction of flying arches and iron rods would always hold the arch springers with absolute rigidity, we should recommend that the ceiling of the Assembly Chamber be recentered, that all broken or defective stones be replaced, and the main side vaults brought into stability by rebuilding or readjustment of loads. We are, however, by no means convinced that, with changes in the amount of water in the clay on which the foundations rest, new settlements may not occur, especially at those places where the footing courses are most heavily loaded. Mr McAlpine, who made a very thorough study of the soil underlying the building, fears that such may be the result. In our opinion it was an error of judgment to erect that most delicate of all architectural devices, a stone-groined ceiling, and particularly one of unusual span and weight, on foundations not absolutely secured against uneven settlement, in a position in which it was obviously impossible to balance all the thrusts except by some extraordinary means. The present construction is very ingenious, and its details have been studied with a minute care which reflects great credit upon its author. But the necessity which he has felt of introducing artificial heat in the attic to insure the safety of the Assembly Chamber, the largest room in this great monumental structure, should alone have been sufficient reason for abandoning the idea of securing the stability of a system of vaults by the devices adopted. In our judgment the continued stability of the vaulted ceiling is a matter of doubt. It might remain without serious failure, but as we cannot count upon its doing so for any definite period, even if all possible repairs are made, we are compelled, with great reluctance, to recommend that the architect be instructed to remove all the stone vaulting (excepting, perhaps, the four small corner vaults), retaining the arches and walls above them that run parallel to the sides of the room, and to supply the place of the groined ceiling with a construction of wood. Such a course of proceeding would remove a very considerable weight from the most heavily loaded parts of the foundation. It would also do away with a large part of the existing unbalanced outward thrust above the columns, so that alterations in the tension of the iron rods above the arches would cease to be an element of danger.

The cracks in the "red corridor" under the Assembly Chamber are no evidence of danger to the building. They are caused by an unequal settlement which apparently affects only the corridor itself. The method of repair suggested to us by the architect will be, in our judgment, effective and permanent.

The cracks in the transverse walls of the former room of the Court of Appeals and in the entrance corridor under it, are of no great consequence unless the settlement of the foundations should continue.

All of which is respectfully submitted.

W. P. Trowbridge.
Charles Babcock.
George B. Post.

Albany, September 26, 1882.

Cologne Cathedral. — Another step toward the entire and final completion of the Cologne Cathedral has just been taken. The iron scaffolding for use in putting on the roof is in place, and the men are about to begin the work of laying down the leaden plates.

MONTHLY CHRONICLE.

September 1. Flood in the Concho River valley, the river rising fifty feet. One hundred and twenty lives lost, and many cattle.

Burning of the City-Hall at Iowa City, Io.

September 2. Explosion of a powder-mill at Tucson, Arizona. One life lost. Damage to surrounding property, $100,000.

Fall of a school-house during construction. Two men killed.

Fall of a floor overloaded with brick during repairs to Hayden's building, Rochester, N. Y. Six men injured.

September 4. Fall of a brick wall at Lancaster, Pa., during repairs. Two men injured.

September 5. Excursion train wrecked near Hugstettin, Germany. One hundred lives lost.

A quantity of jute wet in extinguishing a small fire at Boyce's bagging mill, Muncie, Ind., swells and throws down the walls of the building, causing a total wreck.

September 6. Burning of the Philharmonic Theatre, London, in the morning.

Burning of the Ocean House, Swampscott, Mass. The guests escape unhurt.

September 7. Earthquake at Panama.

September 11. The Beriot Theatre, at Louvain, Belgium, is burned. No lives lost.

Panic at St. Thomas's Church, Cincinnati, during the children's mass, caused by a false alarm of fire. Five persons seriously crushed and trampled on.

September 12. Court-House at Clarion, Pa., is burned. The county records are saved.

September 13. Death of Frank Shanley, C. E., engineer of the Hoosac Tunnel.

September 14. Fall of a buttress of St. Patrick's Cathedral, Dublin, Ireland, causing the death of four women.

Sinking of the lake steamer "*Asia*" on Lake Huron. About one hundred lives lost.

Wind-storm does much damage at Winsted, Conn. No lives lost.

September 18. Explosion of the Aldine Coal Company's powder-magazine near Wilkes Barre, Pa. No lives lost.

September 19. Buildings blown down at Rochester, N. Y.

September 22. The exhibition building at Sydney, New South Wales, is burned, together with its contents.

September 23–25. Equinoctial storm, the rainfall amounting to about fifteen inches in New Jersey, where the storm was heaviest.

September 25. Explosion at the Dodson Mine, Plymouth, Pa. Three lives lost.

Fall of a gallery in the exhibition building at Pittsburgh, Pa. Seven persons injured.

September 27. Earthquake shocks felt in Illinois and Missouri towns, about four o'clock A. M.

A wind-storm demolishes the Evangelical Church at Newton, Kans., during service. No one seriously hurt.

September 28. Fall of a house at 923 Wallace Street, Philadelphia. None of the inmates seriously hurt.

September 29. Burning of the Mississippi River steamer *R. E. Lee*, near Vicksburg. Twenty-one lives lost.

CALCULATING GIRDERS.

New York, October 5, 1882.

To the Editors of the American Architect: —

Dear Sirs, — Professor Ricker's able article on Girders suggests the (now) old question: which is better in calculating strains, the graphical or arithmetical method? In my own experience of a number of years and covering many examples, large and small, I have found the graphical method most suitable for roof trusses, and large or complicated trusses having many members; but for simple cast or wrought iron girders, beams, boxed girders, etc., I have found the arithmetical calculations quicker and simpler. By remembering three simple rules I have been enabled, when pressed in business, to make these calculations on my way to or from business, often on the edges of newspapers, whereas the graphical method would have involved drawing materials and instruments, scale, accurate drawings, etc., besides requiring the memorizing of quite as many rules. These rules are: —

1. If the weights on a girder (*ck.*) are uniformly or symmetrically distributed, each support carries (or reacts) one-half of the total weights. If the weights are unevenly distributed, each support carries, or the reaction of each support is equal to, the *sum* of the products of *each* weight into its distance from the *other* support, divided by the whole length of span.

2. The greatest bending moment of a uniformly or symmetrically distributed weight is at the centre. To find the point of greatest bending moment with uneven weights, find the reaction of either support; then begin at that support and pass over weight after weight, until an amount of weights has been passed *equal* to the reaction, and this is the desired point.

3. The bending moment of a uniform load at the centre is equal to the product of the whole load into one-eighth of the length of span. To find the bending moment of an uneven load imagine the girder cut at the point of greatest bending moment, then the bending moment will be equal to the product of the reaction (on either side) into its distance from the point, less the sum of the products of *all* the weights on the *same* side, into their respective distances from the point of greatest bending moment. To check the whole calculation, try the reactions and weights of the discarded side and the same result will be obtained.

Example. — Three weights of respectively 5 lbs., 10 lbs., and 15

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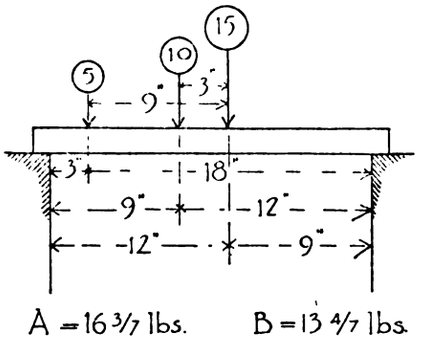
lbs. are placed on a 21″ girder, 3″, 9″ and 12″, from the left-hand support. Find the point and amount of greatest bending moment.

Reaction A will be (in lbs.) $= \frac{5\times18}{21} + \frac{10\times12}{21} + \frac{15\times9}{21} = 16\frac{3}{7}$.

Reaction B will be (in lbs.) $= \frac{5\times3}{21} + \frac{10\times9}{21} + \frac{15\times12}{21} = 13\frac{4}{7}$.

Check, $A + B$ must equal whole load, and we have in effect: —
$A + B = 16\frac{3}{7} + 13\frac{4}{7} = 30$ or $=$ loads $5 + 10 + 15 = 30$.



A = 16 3/7 lbs. B = 13 4/7 lbs.

To find point of greatest bending moment: begin at A, pass over weight 5, plus weight 10, and we still need $1\frac{3}{7}$ lbs. to make amount of reaction A ($16\frac{3}{7}$); therefore greatest bending moment is at 15. *Check*, begin at B, and we arrive at 15 only, before passing amount of reaction B ($13\frac{4}{7}$).

To find amount of bending moment, suppose the girder to be cut at 15, and take left side, then we have bending moment: —

$$M = 16\tfrac{3}{7} \times 12 - (5 \times 9 + 10 \times 3 + 15 \times 0) = 122\tfrac{4}{7}'' \text{ lbs.}$$

Check, take the right-hand side, and we have bending moment: —

$$M = 13\tfrac{4}{7} \times 9 - (15 \times 0) = 122\tfrac{4}{7}'' \text{ lbs.}$$

Again Prof. Ricker expresses his length in feet. I think when he comes to calculate the moments of inertia and resistance of his girders, he will find it more desirable to use inches, and therefore preferable to express his moments in tons-inches or pounds-inches.

I also notice that Prof. Ricker uses the same letter W to express a uniform load or a centre load. This, to me, always confuses formulas and makes it necessary in every case to look up the meaning of each letter. I have adopted a very simple system of lettering, enabling me to *read* my formulas at a glance. For tons or feet I always use *capital* letters; for pounds or inches I always use *small* letters. Again, U means a uniform load in tons; W a load (in tons) at the centre; W_1, W_2, W_3, etc., loads (in tons) at the points 1, 2, 3, etc.; u means a uniform load in pounds; w, a load at centre in lbs; w_1, w_2, w_3, etc., loads (in pounds) at the points 1, 2, 3, etc.; L means length of span in feet; l, length of span in inches; M_1, M_2, M_3, etc., the distances (in feet) from left support; N_1, N_2, etc., do. from the right: m_1 and n_1, etc., being the same in inches; Δ represents deflection in feet; δ the same in inches; C, constant for compression in tons; c, do. in pounds; T, a constant for tension in tons; t, do. in pounds; K, a constant for rupture by breaking in tons; k, do. in pounds, etc. I have given much of my time and study to the subject of strains, and these practical results may interest some of your readers. Respectfully yours,

LOUIS D. BERG, Architect.

NOTES AND CLIPPINGS.

THE CINCINNATI CHAPTER, A. I. A. — At a meeting of the Cincinnati Chapter, A. I. A., held on the 5th inst., the following officers were elected to serve during the ensuing year: President, A. C. Nash; Vice-President, James W McLaughlin; Secretary and Treasurer, Charles Crapsey. Col. George Ward Nichols was elected an Honorary member, and Mr. L. F. Plimpton as practising member. Committees were appointed and additional action taken looking toward the proper entertainment of the Sixteenth Convention of the Institute, to be held in this city on the 25th and 26th inst.

BRICKS AND BRICK-LAYING IN CINCINNATI. — A recent investigation of the brick interests of this city developes the fact that during a period of one year there are used in this city about 61 millions of brick. Of this amount about 45 millions are made inside the city limits, and the balance came from the surrounding country. To make this 45 millions there are 42 gangs of men employed in 37 yards (a few of the yards employing two gangs), and each gang consists of five men, and they make 5,000 bricks per day of ten hours, often working, however, sixteen to seventeen hours per day. Thus each man makes 1,000 bricks per day. They do not work more than 200 days in the year, counting overtime and all, because of the cold and wet weather. As nearly as can be ascertained, the cost of making is about $5.30 per thousand, at the present prices. The price of brick at present is $8.00 delivered at reasonable distances. Pressed brick are not made here. Those mostly used (and there are a good many) come from Zanesville, O., and cost delivered in the city $26.00 per thousand, and about $22.00 per thousand for laying. A good bricklayer on a fancy front can lay only 300 to 400 pressed brick in a day. Of common work a good hand will lay 1,200 brick (1,500 wall count) a day. The day's wages is $4.50 for all hands. The cost per thousand for ordinary work is $10.00 to $12.00 per thousand, wall count.

THE LATEST EXCAVATIONS AT POMPEII. — Our Naples correspondent writes: "The last house excavated at Pompeii in Isola V, Regione VIII, is of an anomalous kind. It is situated at the south side of the isola. Its construction is quite unusual as it possesses no proper atrium. On entering the doorway you find on your right a small stove in the corner of the passage, and on the left is the kitchen proper with a room for slaves. Then to the right is a row of columns, forming a rectangular space, in the midst of which is the triclinium with the reclining bed formed of masonry, and in the centre a cylindrical table covered with slabs of marble geometrically arranged. The wall paintings of this open space are not of great value: there are heads of Medusa, hippogriffs, and fantastic birds. Returning into the passage there is on the left next to the kitchen an exedra, with walls ornamented with yellow and white squares, divided by columns, decorations, and festoons all in fresco. At the entrance of this room are two strange figures; on the left an infant surprised at the sight of a large rat issuing from a trap, and on the right the same infant trying to catch the rat. On the left wall is a medallion with a small figure, two cupids and two flying geniuses, one with a pastoral staff in the left hand and a bunch of grapes in the right, the other with a staff in the right hand and the left supporting a basket on the shoulder. The opposite wall is in a bad condition, so that nothing can be distinguished but the faint traces of a similar medallion. This room was covered, and above it and the kitchen was a second story, to which access was had by a staircase at the end of the ground-floor passage and by a similar passage above. Behind the exedra (always to the left of the passage) comes an enclosed garden. A window into this garden gave light to the staircase. At the extreme end to the right is another small room, with a window opening into the triclinium. This room had another above it, and the sole connection between this upper room with the others on the left was by means of the passage on the second floor. Many vases, shells in bronze, several gold rings with engraved stones, and amphoræ were found in this house, and six skeletons. A walled-up door on the left wall of the exedra makes it probable that the house was once a portion of some other larger dwelling, and that it, like so many others, had been sold separately and undergone various changes. — *From the London Daily News.*

THE SAND IN THE COLORADO RIVER. — Are there any circumstances in connection with the Rio Colorado River, it might be asked, which serve to explain the powerful nature of its action on the rocks? The answer to this question is of the most interesting kind, since it serves to illustrate a new circumstance in river action, and one which renders it highly powerful in its effects on the earth's surface. The Colorado is undoubtedly a fierce torrent. Within the cañons it has a fall or slope of between seven and eight feet per mile, which is twenty times as great as that of the Ohio and Mississippi. But running water alone will hardly accomplish a work of such magnitude as the Colorado has evidently been able to effect. Hence, when the geologist surveys the Colorado more closely he notes that its work and power are largely due to the quantity of sand and like débris it carries down, and which, borne along with its currents, serve like a natural saw or file to wear and eat out the rocks over which it runs. The immense power of sand borne by running water, as an agent in eroding rocks, is thus clearly demonstrated; but the sand must be present in proper quantity, that its work may be thoroughly accomplished. There must neither be too much nor too little sand in the river, if its work is to be thoroughly performed. Too much sand will block up its currents and impede its work, will lie in its bed, and thus protect the rocks instead of contributing to their wear. Too little sand will be swept onward and leave no impression on the river-course. Hence, it is when the river, as is the case with the Colorado, possesses just that modicum of sand which it can keep moving with dire effect to the rocks, that the wear and tear proceed most quickly, and that the work of water is seen at its best. Curiously enough, a tributary of the Colorado illustrates the case of a river which cannot erode its course because of the great amount of sand which it carries. This is the river Platte, which has a fall equal to that of the Colorado, but which is *overloaded* with sand. Hence its action on its course is feeble as compared with that of the Colorado, and its work can never, as things are, compare with that of its neighbor-stream, which has silently but effectually hewn out the land into the great gorges, which are among the most wonderful of Nature's gigantic works. — *Chambers's Journal.*

GASLIGHTED HARBOR BUOYS. — Mr. J. Bellamy, of Byng Street, Millwall, has just completed the third large gaslight harbor buoy for the Trinity House authorities. These buoys are made spherical, 9 feet in diameter, containing inside a cylindrical vessel about 5 feet in diameter, the two being rivetted together and gas-tight joints being made. The shell consists of eight sections and a top and bottom plate made of 3 8 inch steel plates and double rivetted in the seams, steel of about 26 tons tensile strain being employed. On top of the spherical buoy is a low square frame, constructed of angle-irons and bars, which carries the gas-lantern. Both the internal cylinder and the space between cylinder and sphere contains gas at high pressure, and these buoys are constructed to burn for 100 days without requiring to be refilled. The object of having a double casing is that in case of an accident to the outer shell, the inner cylinder shall still contain sufficient gas to keep the lamp alight until the buoy can be removed; the two chambers communicate by a valve opening inwards to the cylinder, and in case of damage to the sphere this valve is forced to its seat by the pressure inside. The buoys are tested with an air pressure up to 100 pounds per square inch, all joints being painted over with soap and water. They are an excellent job in both design and workmanship. — *Engineering.*

THE PLYMOUTH MONUMENT. — The great granite statue of "Education" was safely placed upon the buttress of the "Forefathers Monument" October 7th. The statue occupies the southwest buttress, immediately in the rear of the statue of Morality. This completes the female statues. The two remaining statues — Law and Freedom — will be represented by male figures. Steps have been taken by members of the American Law Association to raise money to furnish the statue of Law.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

265,231. Means for Operating Doors of Elevator-Shafts. — Frederick H. Abeel, Englewood, N. J.

265,236. Wrench. — Thaddeus W. Boyle, Augusta, Ga.

265,238. Endless Package-Elevator. — George W. Brown, New York, N. Y.

265,239. Automatic Air-Cock for Steam-Heat Radiators. — Gilman W. Brown, West Newbury, Mass.

265,253. Paint-Burner. — John A. Felt, Kent, Ohio.

265,256. System of Producing and Controlling Currents of Air for Cooling, Warming, Ventilating, etc., — John Gamgee, London, England.

265,263. Fire-Escape Ladder. — Timothy Howe, Foxborough, Mass.

265,275. Transom-Adjustor. — James T. Olinger, Stelvideo, Ohio.

265,277. Tile for Wells and Cisterns. — George W. Overall, Memphis, Tenn.

265,279. Steam Radiator. — John B. Pierce and Joseph Bond, Buffalo, N. Y.

265,287. Centering Try-Square. — Walter H. Sleeper, Athol, Mass.

265,301. Skeleton Structure.—Edward C. Bates, Boston, Mass.

265,306. Water, Gas, Sewer, or Drain Pipe. — John P. Culver, Tucson, Ariz.

265,308. Shutter-Worker. — Léon O. Dion, Natick, Mass.

265,310. Flood-Valve for Drains. — Frederick M. Dyer, Camden Town, County of Middlesex, England.

265,319-320. Implements for Cleaning Water-Closet Bowls. — Louis O. Howell, Philadelphia, Pa.

265,322. Arched Girder. — Peter H. Jackson, San Francisco, Cal.

265,327. Ventilator. — Peter H. Jackson, San Francisco, Cal.

265,350. Square and Bevel Instrument. — Charles D. Walters, Harrisburg, Pa.

265,372. Trap for Waste-Pipes. — Nicholas Barry, Jr., Muscatine Ia.

265,383. Carpenter's Square. — Willie H. Callihan, Galveston, Texas.

265,384. Hoisting-Machine. — Tyre J. Chaffin, Crystal Springs, Ga.

265,386. Chimney. — Otis B. Colcord, Greenville, Ill.

265,389. Paint. — Jacob B. Cornell, Jacob B. Zook, and Byron N. Cornell, Goshen, Ind.

265,445. Wrench. —Peter Rotermund, Eureka, Cal.

265,448. Safety Attachment for Elevators.— William E. Sawyer, New York, N. Y.

265,474. Locking-Latch. — George Voll, Cincinnati, Ohio.

265,481. Wash-Stand. — Nathan O. Bond, Fairfax Court-House, Va.

265,501-515. Composition for Treating Sulphates of Lime for the Manufacture of Artificial Marble. — Raphael Josia, Florence, Italy.

265,531. Fire-Escape Ladder. — Thomas Miller, Jersey City, N. J.

265,551. Fire-Escape Balcony. — John B. Wickersham, Philadelphia, Pa.

SUMMARY OF THE WEEK.

Baltimore.

Building Permits. — Since our last report thirty-eight permits have been granted, the more important of which are the following: —

Rudolph Nordman, three-st'y brick building in rear of No. 49 Block St.

Frederick Berger, 9 three-st'y brick buildings, Chester St., commencing s w cor. Hampstead St.

4 two-st'y brick buildings, Hampstead St., s w cor. of Chester St.

T. A. Joynes, three-st'y brick building, Franklin St. w Arlington Ave.

H. A. Hayden, two-st'y brick building, Arlington Ave., s of Edmondson Ave.

Peter McMahon, two-st'y brick stable, in rear of s w William St., bet. West and Ostend St.

J. J. Pentz, 4 two-st'y brick buildings, w s Wall St., n of Ostend St.

Henry Stockbridge, two-st'y brick carriage-house, in rear of E. S. Calhoun St., cor Raborg St.

Buck & Jackson, 10 three-st'y brick buildings, Linden Ave., bet. Preston St. and Camel Alley.

Henry Smith, 12 three-st'y brick buildings, Fairmount Ave., bet. Chester St and Castle Alley.

George Hipkins, two-st'y brick stable, in rear of No. 113 West St., bet. Elizabeth Lane and James Alley.

Daniel Ahern, three-st'y brick warehouse, in rear of No. 118 Chester St., bet. Bank St. and Eastern Ave.

Blind Asylum, two-st'y brick building, Saratoga St., bet. Pine and Arch Sts.

John Ziegenheim, two-st'y brick building, and two-st'y brick stable in rear, n w cor. Hudson and Potomac Sts.

Henry Von Heine, three-st'y brick building, and two-st'y brick stable in rear, s s Columbia Ave, w of Parker St.

G. W. Staffer, two-st'y brick building, n w cor. St. Peter's St., and Dawson Alley.

United Brethern in Christ, 2 two-st'y brick buildings, n s St. Peter's St., and two-st'y brick building, w s Dawson Alley, in rear.

Dr. Owens, three-st'y brick building, in rear of No. 103 Fayette St.

Boston.

Building Permits. —*Brick.* — *West Seventh St., Nos.* 124 *and* 126, *and Tudor St., Nos.* 115 *to* 119, Ward 15, for Robert Bishop, two-st'y storage building, 48' x 84' x 105' x 109'.

N St., No. 112, Ward 14, for Henry B. Stratton, three-st'y dwell., 21' x 50'; Henry B. Stratton, builder.

Hampshire St., No. 61, rear of, Ward 19, for Thos. Jackson, two-st'y manufactory, 26' x 35'; Jas. Jackson, builder.

Clarendon St., near St. James Ave., Ward 11, for Frank E. Winslow, skating rink, 100' x 200'.

Portland St., Nos. 57 *and* 59, Ward 7, for Ellen J. Dooley, five-st'y mansard store and dwell., 17' 9" x 21' 3" x 47' 9"; Lanning & Drisco, builders.

Wood. — *Olney St.*, cor. Bowdoin St., rear of, Ward 24, for Patrick and Michael Norton, greenhouse, 15' x 150'.

Garden St., near Linden St., Ward 25, for Royal Winter, 2 two-st'y dwells., 22' 6" x 45'; Herbert M. Perry, builder.

Medford St., Nos. 47 *to* 61, rear of, Ward 3, for Hallowell Granite Co., stone drilling, 26' x 43'; J. B. Wilson, builder.

Princeton St., No. 341, rear of, for Coleman O. Melia, two-st'y dwell., 17' x 27'; James H. Coffin, builder.

Terrace Ave., rear of, near Sheridan Ave., Ward 23, for Andrew Cassidy, stable, 17' x 20'; Andrew Cassidy, builder.

Ashley Ave., near Breed St., Ward 1, for D. Arcy & Atwood, stable, 30' x 30'; G. H. Griffin, builder.

Elm St., near Saratoga St., "Orient Heights," for J. F. Slattery, stable, 18' x 22'; J. F. Slattery, builder.

Florence St., near Ashland St., Ward 23, for Geo. Jepson, two-st'y dwell., 20' x 25' 6" x 30'; E. A. Carter, builder.

Tremont St., Nos. 17 *and* 19, Ward 3, for Charles Robinson, Jr., 2 three-st'y dwells., 21' 6" x 32', ell, 11' 6" x 32': Geo. M. Starbird, builder.

Condon St., Nos. 6 *and* 8, Ward 2, for Wm. Waters, Jr., 2 two-st'y mansard dwells., 18' 6" x 38'.

Norfolk St., near Corbet St. and N. Y. & N. E. R. R. Ward 24, for Samuel N. Ufford, two-st'y dwell., 19' 6" x 33' 6" x 28'; Duncan McKenzie, builder.

Brooklyn.

Building Permits.— *Sixth St.*, s s, 100' w Third Ave., two-st'y frame factory; cost, $4,700; owners, D. Allen's Sons, 166 Front St., New York; architect and builder, D. E. Harris.

Meserole St., No. 241, n s, 325' e Morrill St., three-st'y frame tenement; cost, $3,000; owner, Val Becker, 660 Willoughby Ave.; architect, Th. Engelhardt; builders, Geo. Lehrian, and Jenkins & Gillies.

Jefferson St., No. 126, s s, 240' e Evergreen Ave., 2 two-st'y frame dwells.; cost, each, $2,500; owner and builder, Chas. Treshman, Bushwick Ave., cor. Bremen St.; architect, Th. Engelhardt.

President St., No. 810, s s, 275' 4" e Seventh Ave., four-st'y brick dwell.; cost, $8,500; owner, Sarah W. Burckett, 812 President Street; architect and builder, C. F. Burckett.

Bridge St, n e cor. Plymouth St., four-st'y brick factory; cost, $16,000; owner, P. Cassidy, 1119 Madison Ave., New York; architect, M. J. Morrill; builder, Geo. Phillips.

Heyward St., w s 50' e Harrison Ave., one-st'y brick shed and bake oven; cost, $3,000; owner, John H. Shults, on premises; architect, E. F. Gaylor; builders, W. & T. Lamb, Jr., and G. & A. Langer.

York St., n s, 60' e Washington St., 45' x 90', six-st'y brick factory; cost, $25,000; owners, Ketchen & McDougal, 4 Liberty Pl., New York; architect, Mercein Thomas; builders, J. Ashfield & Son, and Morris & Selover.

Halsey St., n s, 100' w Howard Ave., 12 two-st'y frame dwells.; cost, each, $2,000; owner and architect, G. R. Waldron, 1906 Atlantic Ave.; builder, E. Sutterlin.

Manhattan Ave., Nos. 69 *and* 71, w s, being north of Van Cott Ave., 2 three-st'y frame stores and dwells.; cost, each, about, $2,500; owners and builders, E. & A. Walsh, 268 Oakland Ave.; architect, F. Weber.

Cincinnati.

Building Permits.—Fred Buerning, three-st'y brick building, Wade St., near Dalton Ave.; cost, $3,000.

F. Mooreman, six-st'y brick factory, Front St., near Carr St.; cost, $10,000.

Harancourt Brewing Co., two-st'y brick building, Harrison Ave., near Railroad; cost, $5,000.

John J. Albehl, two-st'y brick building, n w cor. Market St. and Bellevue Ave.; cost, $6,300.

Chas. Farnum, two-st'y frame dwell., Blue Rock St., near Lakeman St.; cost, $2,000.

Wm. Wageman, two-st'y brick dwell., Church St., near Gilbert Ave.; cost, $8,000.

Hide and Oak Leather Co., three-st'y frame building, Providence St., near Findly St.; cost, $4,000.

Seven permits for repairs, cost, $4,600.

Total permits to date, 589.

Total cost to date, $1,716,200.

Chicago.

Apartment Building. — Levi W. Yaggy has commenced another apartment-house, corner of Dearborn Ave and Erie St., from plans by L. G. Halberg. It will be six stories, and will cost $125,000.

Houses. — The same architect has in hand plans for residence for J. A Bell, on Drexel Boulevard, to cost $10,000, and for G. H. Brooks, a residence of Columbia stone, on Division St.

C. P. Kimball is building a house on Ontario St., near Cass St., three stories and basement, pressed brick with white sandstone finish, from designs by W. W. Boyington.

Marvin Hughitt is about to build a house for his daughter, on Indiana Ave., two-st'y and mansard, 25' x 72', of pressed brick. Plans by W. W. Boyington.

Building Permits. — C. H. Williams, two-st'y brick flats, 44' x 46', 345 and 347 South Oakley St.; cost, $6,000.

J. Roeder, two-st'y and basement brick flats, 21' x 56', 390 Webster Ave.; cost, $4,500.

C. Adborg, three-st'y and basement brick flats, 22' x 48', 218 Townsend St.; cost, $6,000.

W. Wilson, two-st'y and basement brick dwell., 23' x 50', 469 West Harrison St.; cost, $4,000.

M. Peters, four-st'y and basement brick factory, 25' x 100', 229 Fulton St.; cost, $10,000.

C. E. Ward, three-st'y brick dwell., 20' x 60', 204 West Lake St.: cost, $8,000.

R. Mosenbacher, two-st'y and attic brick dwell., 20' x 41', 544 North Market St.; cost, $2,500.

W. C. Craig, two-st'y and cellar brick dwell., 42' x 44', Halsted St., near Fullerton Ave.; cost, $8,000.

C. H. McCormick, two-st'y and attic brick dwell., 42' x 44', Belden & Sheffield Aves.; cost, $8,000.

George Schmidt, two-st'y and basement brick dwell., 52' x 66', cor. Goethe and State Sts.; cost, $4,500.

New York.

Alteration. — H. Edwards-Ficken is making extensive interior alterations, and decorating the house of Rev. Roderick Tenny, cor. Madison Ave. and Thirty-third St.

Cotton Exchange. — The Building Committee of the Cotton Exchange have selected the site for the new Exchange, and will commence building as soon as they can get possession of the land.

Theatre. — It is reported that a new theatre is to be built on Twenty-first St., near Fifth Ave., by Mr. Ed. S. Stokes, who has lately purchased property in that location.

Building Materials continue to be held at fairly uniform prices. Dealers being kept busy in supplying orders.

Building Permits. — *Frank'in St., Nos.* 144, 146, 148, *and* 150, 2 seven-st'y brick and stone storehouses; cost, total, $50,000; owners, George P. Slade et al., 110 Leonard St.; J. M. Slade, architect; Wm. G. Slade, builder.

Jones St., No. 17, three-st'y brick stable; cost, $5,500; Williard C. Hunter, owner, 20 Jones St.; C. E. Hadden, architect; mason, John Demorest; carpenter, not selected.

Eighteenth St., Nos. 12 *and* 14 w, nine-st'y brick and stone apartment house; cost, $120,000; owners, Building Association, No. 12 West Eighteenth St., No. 4 Stone St.; architect, A. Hatfield; builder, Hugh Getty.

Twenty-fifth St., Nos. 8, 10, 12, *and* 14, w, eight-st'y hotel; cost, $200,000; owner, M. L. Livingstone, 10 East Forty-eighth St.; architect, J. B. Snook; builders, R. L. Darragh & Co.; iron work, Lindsey, Graff & Megquier.

Forty-third St., Nos. 42 *and* 44 w, one-st'y brick car-house; cost, $4,000; owners, Sixth Ave. Railroad Co., Sixth Ave., and Forty-third St.; builder, N. L. Crow.

Forty-sixth St., Nos. 619 *and* 621 w, 2 five-st'y brick tenements; cost, each, $13,000; owner, Peter Golden, 324 East Fortieth St.; architects, Cleverden & Putzel.

Fifty-seventh St., n s, 100' e Ninth Ave., seven-st'y and attic brick and stone apartment house; cost, $180,000; owners and builders, Terence Farley & Son, 165 East Sixty-first St.; architects, Thom & Wilson.

Fifth Ave., s w cor. Fifty-fourth St., 2 four-st'y brick and stone dwells.; cost, $175,000 and $150,000; owner, Wm. H. Vanderbilt, 640 Fifth Ave; architect, J. B. Snook; builders, Robert L. Darragh & Co.; brownstone work, Jas. S. Sinclair & Co.; iron work, A. J. Campbell.

First Ave., e s, from Seventy-ninth to Eightieth Sts., 8 four-st'y brownstone stores and tenements; cost, each, $13,000, owner, Michael Duffy, 256 East One Hundred and Second St.; architect, A. Spence.

Seventy-ninth St., n s, Eightieth St., s s, 75' e First Ave., 2 four-st'y brownstone tenements; cost, each, $12,500; owner and architect, same as last.

Ninety-second St., s s, 225' w Third Ave., five-st'y brownstone front flat; cost, $18,000; owner and mason, Morris R. Williams, 602 East Fifteenth St.; architects, Thom & Wilson.

Ninety-second St., s s, 255' w Third Ave., five-st'y brownstone front flat; cost, $30,000; owner and architects, same as last.

Ninth Ave, n w cor. Seventy-first St., 7 four-st'y brownstone dwells.; cost, each, about $15,000; owners, John Noble and Elbert Post, 1238 Third Ave.; architect, F. T. Camp.

Eleventh Ave., s w cor. Sixty-ninth St., five-st'y brick tenement; cost, $18,000; owner, Conrad Michaels, s e cor. Ninth Ave., and Sixty-seventh St.; architects, Thom & Wilson.

Third Ave., e s, 99' 11" n One Hundred and Twenty-sixth St., five-st'y brick store and tenement; cost, $20,000; owner, Richard Connor, 313 East One Hundred and Twenty-sixth St.; architect, G. Robinson, Jr.

Seventh Ave., n w cor. One Hundred and Twenty-Seventh St., five-st'y brownstone store and tenement; cost, $30,000; owner, Samuel H. Bailey, 186 East One Hundred and Fourth St.; architect, F. T. Camp.

One Hundred and Twenty-sixth St., s s, 233' w Third Ave., five-st'y brick tenement; cost, $15,000; owner and architect, same as last.

Philadelphia.

House. — Leiper St., (Frankford), residence for Wm. Rowland, Esq., three-st'y, 50' x 70'; cost, $10,000; Harzlehurst & Huckel, architects.

Material Market has been without fluctuations of any note for some weeks past, remaining at about present quotations.

Churches. — The Baptists are about to build a chapel on Powelton Ave., near Thirty-seventh St.; size, 40' x 60'; Benj. Linfoot, architect.

"Wissahikon M. E. Church" to be built of light natural stone with Hummelstown brownstone trimmings; size, 52' x 65'; Hazelhurst & Huckel, architects.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 356.

OCTOBER 21, 1882.

Entered at the Post-Office at Boston as second-class matter.

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WE publish in another column a letter explaining the circumstances of the fall of the walls of the Texas State-house, from which it appears that the building which failed was a temporary structure, under the care of a different architect from the designer of the intended permanent building, which is as yet not advanced beyond the excavations. We are glad to know that the architect of the latter edifice does not deserve the aspersions which were certainly implied in our remarks on the subject, and we withdraw them with pleasure, so far as he is concerned.

DR. SEYMOUR HADEN, the most distinguished modern master of the art of etching, intends, as has been already announced, to visit this country next month for a short lecturing tour. It is only a few years since a French critic announced that "a great artist had been discovered in England," and a little later, the publication of a series of matchless landscapes proved the correctness of the Frenchman's judgment. Most persons who interest themselves in matters of art have seen some of Dr. Haden's work, although the prints from his etchings, owing to the resolute conscientiousness with which the plates are destroyed as soon as they show the slightest sign of wear, are difficult to obtain, but every one does not know that the author of these masterly productions has been for a long time, and still is, a surgeon of high reputation and extensive practice, who draws and engraves the natural objects which please him simply as a recreation, and for twenty years never thought of publishing his works, which might still be unknown beyond the circle of his own family and friends if M. Berty had not met accidentally with them. It is pleasant to know that Dr. Haden will lecture on the topic with which his name is usually connected, and it is to be hoped that his visit may serve to revive the efforts of that promising group of American etchers whose work, since the discontinuance of the *American Art Review*, has ceased to be accessible to the general public.

THE New York Board of Health has turned its attention to the wells for water-supply, of which about two thousand are believed to exist in the city. Most of these are pipe-wells, either driven with a mallet or drilled like a shallow Artesian well, and about a thousand of this kind are said to have been sunk within the last three years. Professor Elwyn Waller, of Columbia College, has been engaged in analyzing the water from such of the wells as could be discovered, but as most of them are purposely concealed the analysis can only be taken as an indication of the general quality of the water. According to Professor Waller, this is by no means good. Out of fifty samples analyzed the greater part were pronounced unfit for use, containing large quantities of dissolved minerals as well as organic contamination. In some instances the well-water was found to be more highly charged with salts than that of the ocean itself, and in others the dissolved carbonic acid contained in it was sufficient in amount to corrode the lead pipes and tanks through which it passed. The largest consumers of well-water are the brewers, who use it for washing and cooling, saving in some cases, besides the five or six thousand dollars a year which the Croton would cost them, a considerable additional sum on account of the coolness of the well-supply, which, being drawn in summer at a temperature twenty-five degrees below that of the Croton, saves the expense of the ice which would otherwise be needed to reduce the Croton to the same point. The manufacturers of cheap mineral waters are said also to take a large part of their supply from wells, and many are in use for furnishing water for hydraulic elevators and similar apparatus. The Board of Health proposes to compel the closing of wells found by analysis to furnish contaminated water, and naturally meets with a good deal of opposition in its investigations.

THE *Sanitary Engineer*, with commendable public spirit, has come to the assistance of the National Board of Health, which, after two years of important services, was rather ignominiously deprived by the last Congress of the means for publishing the information gathered in its name, and proposes hereafter to continue in its own pages the *Bulletin* of the Board, which is no longer to be issued in separate form. In the number for October 12 appears accordingly the regular report of mortality from forty cities of the United States, together with notes from various correspondents of the Board, all of great interest. Although we regret the contemptuous discourtesy with which Government support was withdrawn from a body so useful and deserving, we are not sure that the Board is not to be congratulated on the change, as well as the readers of the *Sanitary Engineer*. So long as the succession of statistical reports is uninterrupted, a matter which is of the greatest importance, there is no harm, but rather an advantage, in having them appear in a form where they can receive freer criticism than would be possible under other circumstances. For instance, the health officers of certain cities, in their anxiety to show a favorable rate of mortality, are apt to add a liberal estimate of the increase of population in their districts to the census returns of 1880, and this practice, which detracts very much from the value of their testimony, is sure to be sharply commented upon under the new arrangement, and perhaps corrected.

ANOTHER "blow-out" occurred last week on the New York side of the Hudson River Tunnel, which has not yet emerged from the treacherous gravel which lines the eastern shore into the silt formation that forms the greater portion of the bed. Taught by previous experience, the engineers of the tunnel carry out the heading in the gravel with extreme caution, and the workmen had ample time, after finding that it was impracticable to stop the entrance of water with the bags of mud provided for the purpose, to make their escape quietly by the air-lock. The manager of the company attributes the accident to the loosening of the ground caused by cutting off the iron piles, about seventy of which, belonging to an old pier, must be removed in order to give passage to the tunnel. The porous mass, disturbed by the movements of the workmen and their tools, would naturally present a less uniform resistance to the compressed air of the tunnel than the same formation in its natural state, and a channel of escape for the air once opened, water would flow in with a rapidity proportioned to the loss of pneumatic pressure. Fortunately, the gravel bank which has put the pneumatic system of subaqueous tunnelling to so severe a test is nearly penetrated, and a few feet more will bring the excavation into a compact, cheese-like mass of silt, whose steady resistance to the air-pressure will enable the work to be carried on with redoubled rapidity.

ON and after April 1, 1883, the manufacture or sale of wall-papers colored with pigments containing arsenic will be prohibited throughout the German Empire, together with that of dress-goods containing similar colors, and toys and food packages decorated with poisonous substances. It is much to be desired that a similar law could be enacted in the various States of this country, and local sanitary associations and boards of health would earn the gratitude of their fellow-citizens by an energetic agitation of the matter. The cases of poisoning by deleterious dyestuffs in clothing are more common than most

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persons suppose, but those of obscure disease caused by arsenical wall-papers are probably more common still. There is a popular notion that bright green is the only dangerous color in paper-hangings, and papers containing this color have accordingly a very small sale; but arsenic enters into the composition of brilliant reds and yellows as well as greens, and Paris green and orpiment are mixed with other pigments to form grays, browns and similar tints in which their presence is hardly suspected. Nothing but chemical tests of all the colors in all the wall-papers in his house can, under the present conditions, assure the owner that the health of some member of his family is not being slowly undermined by the inhalation of the particles which are continually brushed or detached from them, and no occasion could be better than the present revival of the fashion of such decorations for the enactment of regulations which might prevent the taste from being in some cases a most pernicious one for those who indulge it.

The Arc de Triomphe in Paris is to be surmounted with a group of statues by M. Falguière, the most distinguished of the rising generation of French sculptors. It is certain that the original design contemplated an addition of this kind, but the Parisians have become so accustomed to seeing the arch in its present condition that the proposition to complete it according to the original intention did not meet with great favor, and M. Falguière, who has gone to considerable expense in preparing models of the full size for trying the effect, may perhaps even now spend his time and money for nothing; but curiosity is strong in Paris, and the sight of the models will dispose the public to wish for the finished work. The central group is to contain an allegorical figure of France, as a woman standing in a Roman chariot, drawn by four horses abreast, which are led by other female figures representing Progress. In front of the chariot and horses, on the side toward the Tuileries, is another group, representing Liberty overcoming official tyranny, and on the side toward the Bois de Boulogne are two groups illustrating the defence of the country. It is not an easy matter to design a consistent series of statues large enough to cover a space like that of the Arc de l'Etoile, but M. Falguière will probably succeed if success is possible.

In the discussion now going on with regard to the practicability of placing all telegraph and telephone wires underground, it is often asserted that no electric wires are allowed to be carried over the roofs of European cities. To show how groundless this notion is, it may be worth remarking that according to the *Deutsche Bauzeitung* there are now fourteen hundred and fifty miles of telephone wire strung over the city of Berlin by means of standards erected on the roofs of the houses. The burying of telegraph wires in Germany seems to have been applied only to the military lines, and is said to have been effected at great cost, mainly for the sake of concealing their position from the enemy in case of invasion. In fact the problem of removing wires from their inconvenient and dangerous position above the buildings of our large towns seems to have been more earnestly investigated, and more successfully solved, in the United States than in any other country. The various conduit corporations now in process of formation here to lay insulated pipes and rent wires in them to telegraph and telephone companies seem admirably adapted to supply a serious want in the best and most economical way, and if their patented devices for insulation prove satisfactory, they have probably a useful and profitable career before them.

The sales which the French Government is making of the national bric-à-brac and furniture of all kinds ought to attract more attention among amateurs than they do. Very lately an auction was held in the cour d'honneur of the Palais Royal of objects taken from this and other palaces now become public property, and comprising columns and pilasters, carved panels, capitals, pedestals, doors and dressings, cupboards, book-cases, and many other articles of wood and metal. Among other things a number of the eagles which were used under the Empire to decorate all sorts of places were sold to a junk-dealer for five hundred francs, and the entire proceeds of the sale were only about sixteen thousand francs. Comparing this with the enormous prices obtained at the Hamilton sale, where two small pieces of furniture of French manufacture of the last century brought ninety-four thousand five hundred dollars, it would seem that purchasers might consult their interest by seeking such articles in the place where they were made rather than in noble and famous collections. Complaint is made in France that the officials of the small country churches sell without scruple the mediæval and Renaissance furnishings stored in their sacristies to bric-à-brac dealers and amateurs, who replace them with tawdry objects of the modern conventional type. In this way the shops of the quais of Paris are constantly replenished with ancient sacerdotal vestments and lace, altar-pieces, holy-water vases, censers and furniture, which are scattered thence all over the world, to the advantage perhaps of art in general, but to the detriment of that of France.

An interesting point relating to the responsibilities of architects is discussed in *La Semaine des Constructeurs*. As the case is described, a certain contractor for roofing executed five years ago a roof in tiles of the sort called "tuiles Montchanin," which proved to be unfit for their purpose, scaling away in such a manner that the whole roof will soon have to be relaid. The questions asked are, (1) "Who must pay the cost of making good the decayed roof?" and (2) "If the contractor is without resources can the architect be made to pay the expense?" To these questions *La Semaine* replies that in this instance the contractor alone is responsible for the restoration of the roof, under the article 1641 of the Code Civil. The contractor is virtually the vendor of the tiles, and as such is liable for all concealed defects of the articles sold by him which unfit them for their ostensible use, or which so far diminish their value for that use that the purchaser, if he had known of the defects, would either have refused to buy the tiles or would not have given so high a price for them as he did. So far as the architect is concerned, the bad quality of the tiles is not due to any fault of his, and he is in no way responsible for it, although the Montchanin tiles were ordered by his direction. His position is simply that of a purchasing agent for his client, who has been deceived by the specious appearance of the tiles, but nothing more, and his client, as the real purchaser, is the one to seek redress from those who sold him the goods.

The *Fireman's Journal* gives statistics of losses by fire in the United States and Canada during the past month, from which it appears that although there have been no very remarkable conflagrations, the aggregate of property destroyed is very large. Its own record mentions only those fires in which the loss exceeds ten thousand dollars, but of these there were in September one hundred and twenty-five, which consumed about six and one-quarter million dollars' worth of property. To these should be added the losses by fires omitted in the record, which it estimates at one million three hundred thousand more, making the total cost of the nation's September ash-heap, — to use its own vigorous expression,—seven and one half million dollars. This amount is about twenty-five per cent more than the average of the September loss for the past five years, and the *Journal* remarks that the increase in the number of fires seems to be continuous, partly on account of the natural addition to the volume of combustible property in the country, and partly, perhaps, by reason of the multiplication of hazardous occupations and manufacturing processes. Meanwhile, the rates of insurance continue low, and the total of the year's business seems likely to be very unfavorable to the companies. For the first six months of the present year the losses to the fire underwriters equalled seventy-one per cent of the premium receipts; and as the average cost of carrying on the business is about forty-five per cent of the premium receipts, the net result to the stockholders is a loss equivalent to sixteen per cent of the gross receipts for the year. In former years such deficits have been covered by the income from property held by the companies, but if, as seems probable, the business of the last half of the year is even more disastrous than that of the first, this resource will not serve in all cases, and the weaker companies must succumb. The *Fireman's Journal* very sensibly points out that under present circumstances no decrease in the proportion of losses can be expected, and that the underwriters themselves can alone supply the remedy for the unsatisfactory condition of their business, by modifying rates in proportion to the risk, and thereby making it for the interest of owners to put their buildings in condition to resist fire. As we have repeatedly expressed the same opinion, we need add nothing to the remarks of the *Journal*, except perhaps to say that the underwriters seem slow to profit by them.

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PAPERS ON PERSPECTIVE.—XIV.

[THE papers on Perspective printed in these columns during the spring and summer of 1878, came to a somewhat abrupt conclusion. The last of the series which was numbered XIII, and which appeared on the 21st of September of that year, was devoted to the discussion of the phenomena of Curvilinear or Cylindrical Perspective, the kind of drawing which would be made upon the inner surface of a vertical cylinder, the axis of which was occupied by the spectator. This is the kind of perspective employed in making cylindrical panoramas, and, as was pointed out in the text, it is the system which one naturally adopts in sketching from nature. In this case one almost necessarily makes the size of objects in his drawing proportional to their apparent angular dimensions, just as if he were drawing upon a concave surface.

The previous paper closed with the promise that the next paper should show how drawings in Curvilinear Perspective might be geometrically constructed. The following paper fulfils this promise; Plate XVI illustrating this part of the subject, as Plate XIV did the previous part. There is no Plate XV.[1] This paper will be followed by others upon the perspective of converging and diverging lines, and of shadows cast by artificial light, upon some other systems and methods, including the system of the late M. Adhémar, and upon the interpretation of perspective drawings, or the recovery of the data from which they are constructed, by an inverse process.]

THE application of Plane and of Cylindrical Perspective to the same object giving such different results, and Cylindrical Perspective being, as we have seen, the method one naturally adopts in sketching from nature, it follows that any attempt to apply the principles of Plane Perspective to such sketches must lead to confusion. This attempt is, however, constantly made; artists, in trying to avail themselves of the materials they have collected in their note-books, frequently resorting to the rules of perspective to correct the inconsistencies and errors, and to fill in the omissions of the originals. The vexation and trouble into which this inevitably brings them—for a drawing made upon a cylinder cannot be treated as if it were made upon a plane—has produced a very general impression among them that the principles of perspective, though true in theory, are, as they say, practically false; that they doubtless work very well for geometrical work, like architectural drawings, but that when applied to nature, to the delineation of real things, even to real buildings, they break down.

284. It is, indeed, plain that such sketches must be interpreted in the light of the system according to which they were made. It is the principles and rules of Curvilinier or Panoramic Perspective that must be called in to complete them by. This being so, it is worth while to inquire on what geometrical principles this system rests, what are its practical methods, and what are its relations to the system of Plane Perspective.

285. If the picture is supposed to be drawn not upon a vertical plane, but upon a vertical cylinder, with the spectator at the centre, or axis, it is plain that, so far as concerns the horizontal dimensions of objects, their perspective representations will be exactly proportionate to their apparent angular dimensions, a given linear measure will correspond to a degree of arc on the horizon, and a given length of horizon in the picture to the whole circumference of 360°. Every part of this horizon will be equally near the station-point, and every point in it may, in turn, be considered as the Centre. We thus entirely avoid those distortions which, in Plane Perspective, necessarily result from the visual rays crossing the plane of the picture at an acute angle, as they must do everywhere except just opposite the station-point. All the rays, at least the rays coming from all points of the horizon, cross the picture at right angles: everything is, so to speak, at the Centre.

286. And just as in Plane Perspective the perspective of a straight line is the line in which the plane of the picture is intersected by a plane of rays passing through the line and also through the eye or station-point; and just as the trace of every system of planes is the intersection of the plane of the picture by a plane passing through the eye parallel to the other planes of the system; so now the perspectives of lines, and the traces of systems of planes, are the lines in which these planes of rays intersect the *cylinder* on which the picture is to be drawn. This, which has already been illustrated in Figures 66 and 67, Plate XIV, is more fully set forth in Figure 71, Plate XVI. Here S, in plan and elevation, represents the station-point in the axis of the cylinder of the picture. If, now, *a*, *b*, *c*, and *d*, in the elevation, are parallel horizontal lines, shown in plan at L, the plane of rays lying between them and the eye will cut the cylinder A at a', b', c', and d', the line of intersection being an ellipse, or, at c', a circle. If the cylinder is turned a quarter round, as at B, these lines of intersection will appear as semi-ellipses at b'' and d''; the semi-circle c', however, appears still as a straight line at c'', while the line a', lying at an angle of 45°, appears as a semi-circle at a''.

In like manner the line at *e*, at right angles to these lines, and shown in plan at R, gives the semi-circle e'' in A and the line e' in B.

287. If now the cylinder is developed, these lines of intersection will appear as in Figure 72. The circle of the horizon at c'' will become a straight line: the vanishing points v^l and v^r, $v^{l'}$, and v', will appear at V^L and V^R, $V^{L'}$ and $V^{R'}$, 90° apart; while the semi-ellipses a'' b'' d'' e'' will be developed as the curves a''' b''' d''' e''', parallel to the horizon at their highest point, representing the point where *a*, *b*, *d*, and *e* are nearest the eye, and converging towards their vanishing points, as parallel lines ought to do. The height of the lines a''' and e''', representing *a* and *e*, which lay 45° above the horizon, is equal to the radius of the cylinder. If the secant planes, a' b' d', Figure 71, had been carried entirely across the cylinder, forming whole ellipses, as shown by the dotted lines, these curves would be continued beyond the point $V^{L'}$ on the opposite side of the horizon, as far as the point $V^{L''}$, which is, of course, the same point as V^L, being 360° distant from it.

288. These curves, always concave towards the horizon, with points of contrary flexure where they cross it, and points of maximum curvature where they are at their greatest distance from it, are what are called in geometry sine-curves, or cosine-curves, and are similar to those obtained by the projection of a regular spiral. It will be observed that the angles at which they cross the horizon are the same as those in Figure 71, A, and measure the angular distance of the lines represented above the horizon at their nearest point. The maximum distance of the perspective of each line from the horizon is proportional to the tangent of this angle.

289. The perspectives of vertical lines and the traces of vertical planes are of course vertical, and these lines are straight, being elements of the cylinder, and they remain straight when the cylinder is developed. The perspectives of inclined lines and the traces of inclined planes are sine-curves, since they too are the lines in which the cylinder is cut by planes; but their vanishing points, instead of being upon the horizon are above and below it, as, for example, V^N and $V^{N'}$ in Figure 72. But they are all parallel to the picture at the point where they are nearest to it and to the eye, half way between their vanishing points, and there have their real inclination.

290. It is a property of a *system* of sine-curves,—that is to say, a series of curves crossing the horizon at the same point, like the perspectives of a system of parallel lines,—that vertical lines drawn across them are divided proportionally to the maximum heights of the curves, and that for each vertical line the tangents to the curves, at the points of intersection, meet at the same point on the horizon. It is necessary, then, to construct only one line of such a system, by developing the line of intersection. The position of any other line, of which the angular distance above the horizon, and consequently the maximum height is known, may be found at any point by drawing a vertical line, and its direction at that point may be found by drawing a tangent. In this respect a number of sine-curves drawn between the same two points are analogous to a number of ellipses with the same major axis (265), as illustrated in Figure 48, Plate X.

291. In Figure 73, for example, the distances cut off by the curves upon h h are proportional to those cut off upon t t, as may be seen at t' t', and the tangents at the points of intersection all meet at V^L_P. These tangent lines lie in a plane tangent to the cylinder, before it is rolled out flat, along the line t t. This relation is shown in Figure 71, Plan, from which it clear that these tangent lines are the perspectives upon the plane p p, regarded as a plane of the picture, tangent to the cylinder at the point t, of the same lines whose perspectives are given upon the cylinder by the curves. Of course they meet at a point. This point, V^L_P, is then the vanishing point in Plane Perspective of the same lines whose vanishing point is found in Curvilinear Perspective at V^L_C. The plan in Figure 66, Plate XIV, exhibits similar relations.

292. These considerations make it practicable not only to draw all these curves without difficulty when one of them has once been constructed, but in practice to dispense with all but one entirely, treating each separate portion of a panoramic picture as if it were drawn on a vertical plane tangent to the cylinder in that place.

This is illustrated in Figure 74, *a*, where we see, as in Figure 66, an object L R, the station-point at S, and, between them, both a cylinder and a plane of projection. The object not being very large, its picture on the cylinder will not differ perceptibly from its picture upon the plane; and the latter, being easier to draw, may be substituted for the other, using V^L_P for V^L_C, and V^R_P for V^R_C.

293. Figure 74, *b*, shows that, in laying out a panorama, it is not necessary to draw even a single sine-curve, the points V^L_P and V^R_P being ascertained directly from V^L_C and V^R_S, in accordance with the following rule:—

Given the Horizon, the vertical line of tangency, and the vanish-

[1] Plate XV and the appropriate text will be included in the monograph on perspective which is to be published this fall in book-form.

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ing points on the cylinder, set off below the Horizon, on the vertical line of tangency, the radius of the cylinder; with this radius describe an arc tangent to the Horizon; on this arc, lay off, right and left, the distances of V_C^R and V_C^L; prolong the radii through the extreme points thus attained, and the points where they strike the Horizon will be the vanishing points required, V_R^P and V_L^P, on the Horizon of the tangent plane. The rest of the construction can then take place as in Plane Perspective.

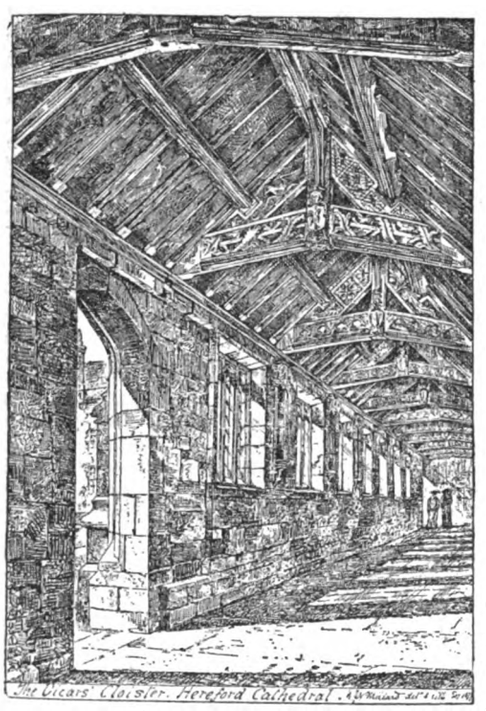
This rule explains itself if we observe that Figure 74, *b*, is the same as Figure 74, *a*, with the two parts brought together.

295. Figure 75, which is taken from the etching of Greenwich Hospital, in Turner's "Liber Studiorum," further illustrates the occurrence of curved lines in sketching from nature, when every object is drawn of just the shape and relative size that it presents to the eye; that is, in proportion to its angular dimensions.

296. In a drawing upon a vertical cylinder, although the horizontal dimensions are proportional to the angular dimensions of the objects represented, vertical dimensions are proportional to the tangents as upon a plane. If it were practicable to draw upon a spherical surface, this would not be so, the linear dimensions in every direction being made proportional to the angular dimensions. The employment of a horizontal cylinder to draw upon, or in, would, of course, effect this for vertical dimensions. This is practicable for isolated objects, and the result may sometimes be seen in sketches of lofty buildings or towers. The curvature of the lines and the apparent convexity of the object, making the tower look as if it were strutting or leaning over backwards, are, however, quite as offensive as in the case of horizontal lines. But here, as in the case of the street shown in Figure 69, these defects disappear when the object is of irregular outline; and this method has the advantage, of course, of giving the actual *aspect* of a tower or spire from a given point, with its foreshortening and altered outline, better than the other. Figure 76 illustrates this, showing at A a view of the spire of the Central Church in Boston, taken from a photograph, and consequently drawn on the principles of Plane Perspective. At B is a sketch of the same spire, taken at a corresponding distance, drawn upon the surface of a horizontal cylinder with a revolving camera obscura.

GIRDERS.—III.

II.—TO DETERMINE STIFFNESS OF GIRDER AND AREA FOR RESISTING SHEAR.



The Vicars' Cloister, Hereford Cathedral.

HAVING obtained the bending moment and shear which act at any point of the girder and are caused by its load, also knowing the material of which it is to be composed, we have next:

1. To determine the minimum stiffness required at that point of the length of the girder, to safely resist the bending moment.

2. To determine the additional area which must be added to the cross-section, for the purpose of safely resisting the shear.

The stiffness of the girder will evidently depend on the following conditions:

1. On the material of which it is composed. This element is provided for by assigning suitable values to the constants in the formulæ which are employed.

2. On the horizontal breadth of the section, with which it directly varies.

3. On the vertical depth of the section, varying directly as the cube of this.

If the sections of all girders were solid and rectangular, the ordinary formulæ for beams of rectangular section could be used, and the required dimensions of the cross section quickly obtained; but it is rare that such simple forms are used, excepting for wooden girders, and the sections are often quite complex, so that some more indirect method of expressing and obtaining the stiffness required, must be adopted.

It has been demonstrated that this stiffness depends directly on the value of the "moment of inertia" of the cross section of the girder, and that this is true for any form of section and any material. (Wood's Resistance of Materials, edition of 1875, p. 104.) This moment of inertia is represented by the symbol I, and its numerical value may be obtained for any given section, as follows:

Suppose that a horizontal line is drawn in the plane of the section, through its centre of gravity. Take any minute fibre or small area of the section, find its area and multiply this area by the square of the distance between its centre and the horizontal line previously drawn. Do this for all the fibres of the section and take the sum of all these products, without reference to the position of the fibres above or below the horizontal line. The sum of the products will be the required moment of inertia of the section. This method is here given rather as a definition of the meaning of the moment of inertia of a section, than for practical use.

The numerical value of the moment of inertia of a given section may be more readily found by one of the following methods:

1. By formulæ which are given for the more common and simpler sections, in the various pocket and text books.

2. By means of the calculus, by integrating the general equation and obtaining formulæ for special sections. This can only be applied to very simple forms of section, without great difficulty.

3. By the graphical method, which is applicable to any form of section, is perfectly general, easy of application to any special case, and requires no extended knowledge of the higher mathematics. It will therefore be fully explained, as it is less widely known than it deserves.

When a bending moment acts at any point of a girder, it tends to bend the girder in the direction of its action, so that the girder becomes curved, usually being concave on its upper, and convex on its lower side. On the concave side the fibres are compressed or shortened, while they are extended on the convex side. Between these will be found a layer of fibres which are unchanged in length, and which are usually called the neutral plane or axis. It is generally true, and is always assumed that this neutral layer of fibres passes through the centre of gravity of any cross section of the girder.

If the bending moment be sufficiently great the girder may fail in either of two ways:

1. By breaking; the upper fibres crushing or the lower ones rupturing, when the girder suddenly gives way.

2. By bending: when the girder may be in no danger of breaking, but deflects so much as to crack the plastering or to become very unsightly.

Hence two different series of formulæ become necessary, for breaking and for bending, both of which must be applied to any particular case, and the *safest* result taken as the true one.

I.—BREAKING.

The general formula usually employed is that given in Wood's Resistance of Materials, edition of 1875, p. 175.

$$\Sigma Px = \frac{R}{d'} I \qquad (1.)$$

In this formula:

ΣPx = the bending moment in inch-lbs.

R = modulus of rupture = strain in lbs. per square inch on those fibres most distant from the neutral axis, on that side which first gives way.

I = moment of inertia of the section.

d' = distance from the neutral axis, or the horizontal drawn through the centre of gravity of the section, to the most distant fibres, in inches.

This formula requires considerable modification to adapt it to the form in which the bending moments have been obtained.

Let M = bending moment in foot-tons. Then $\Sigma Px = 24000\ M$.

For a square bar supported at each end, with load concentrated at the centre between supports, the general formula becomes:

(Wood's Resistance of Materials, p. 154.)

$$\frac{PL}{4} = \frac{1}{6} Rbd^2. \qquad (2.)$$

Here, P = centre breaking load in lbs.

R = modulus of rupture in lbs.

b = breadth of the bar in inches.

d = depth of bar in inches.

Suppose the bar to be one inch square and one foot in clear length between the supports.

Let B = the centre breaking load of such a bar, in tons.

Let L' = clear length of the bar in feet, = 1 foot.

Then $P = 2000\ B$, and $L = 12\ L'$.

Substituting these values in formula 2, we obtain $R = 36000\ B$.

Substituting the values of ΣPx and R in the general formula 1, and reducing, we have:

$$I = \frac{M\ d'}{1.5\ B} \qquad (3.)$$

Let f = a factor of safety.

Inserting this factor f in the general formula 3, we finally obtain:

$$I = \frac{M\ d'\ f}{1.5\ B} \qquad (4.)$$

This is the required general formula for breaking, for determining the value of I, or stiffness, when M is given. It is perfectly gen-

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eral, and is applicable to any form of section and any arrangement of the loading.

In this formula B = coefficient for breaking for the material = the centre load in net tons which will just break a bar one inch square and one foot in clear length between supports. Values of B will be given for the different materials.

II. — BENDING.

Two general formulæ are usually given for bending. (Wood, Resistance of Materials, pp. 113, 114.)

1. Load concentrated at centre of the girder.

$$\Delta = \frac{W L^3}{48 E I} = \text{maximum deflection in inches.} \quad (5.)$$

2. Load uniformly distributed.

$$\Delta = \frac{5 W L^3}{384 E I} = \text{maximum deflection in inches.} \quad (6.)$$

Notation employed in these formulæ is as follows:

Δ = maximum deflection of girder in inches.

W = total load on the girder in lbs.

L = clear length of girder in inches.

E = modulus of elasticity of the material in lbs.

The term "modulus of elasticity" can be defined in two ways.

1. It is the ratio between the strain (compression or tension), on a bar one inch square, and its shortening or elongation per inch in length.

2. It equals that tensile strain in lbs. which would theoretically stretch a bar one inch square to just double its original length, neglecting changes in cross section and breakage.

These formulæ can also be put in a more convenient form:

Let r = the maximum permissible deflection of the girder, per foot of its length.

Let L' = clear length of girder in feet.

Let W' = load on girder in net tons.

Let E' = modulus of elasticity, expressed in net tons, or the coefficient for bending.

Evidently, $\Delta = r L'$; $L = 12 L'$; $E = 2000 E$; $W = 2000 W'$.

According to Wood, p. 154, the bending moment at centre of girder in inch-lbs., will be:

$\frac{1}{4} W L$, for a load concentrated at the centre.

$\frac{1}{8} W L$, for a load uniformly distributed.

Let M = the same bending moments expressed in foot-tons.

Then $\frac{1}{4} W L = 24000 M$, and $W L = 96000 M$, for concentrated load.

And $\frac{1}{8} W L = 24000 M$, and $W L = 192000 M$, for uniform load.

Substituting these values of Δ, L, W, and E in the general formulæ 5 and 6, reducing and omitting accents, we finally obtain the following general formulæ:

$$I = 144 \frac{M L}{E r}, \text{ for concentrated load.} \quad (7.)$$

$$I = 180 \frac{M L}{E r}, \text{ for uniform load.} \quad (8.)$$

Values of E will be given for the different materials, but they can be readily obtained by dividing the values of the modulus of elasticity, given in the text-books, by 2000.

Since any mode of arranging the loading must be intermediate in its effect, between an equal load concentrated at the centre and one uniformly distributed, the two general formulæ just obtained will give the two limiting values of I, between which the true value lies, approaching either limit as the mode of loading approaches that corresponding to the limit.

Formulæ have been obtained for some of these intermediate forms of loading, but they are few, complex, and can usually only be applied by those who have a full theoretical knowledge of the entire subject. Therefore, it will usually be preferable to apply the two general formulæ for bending here given, and then select a value of I between the two limiting values obtained, and which is judged to most nearly correspond to the mode of arrangement of the loading. But it will always be perfectly safe to take the larger of the two values obtained, though this will occasion the use sometimes of a little more material than is absolutely necessary.

III. — SHEARING.

Since the shearing strain acts at right angles to the girder the additional area required to safely resist it will vary directly as the shear itself.

Let A = this additional area in square inches.

Let S = coefficient for shearing, for the material, being the ultimate resistance to transverse shearing of a bar one inch square in net tons.

Let f = a factor of safety.

Let W' = the shear in net tons, acting at the section considered.

Then $A = \frac{W' f}{S}$, = the required general formula. (9.)

Having solved the second portion of the proposed problem, we may pass to the third.

TABLE OF COEFFICIENTS FOR DIFFERENT MATERIALS.

Material.	*S.*	*E.*	*B.*
Ash, white,	3.14	807.	.302
Beech,	2.61	676.	.250
Cherry,	1.47	615.	.325
Chestnut,	.77	516.	.261
Hemlock,	1.38	829.	.198
Maple,	3.13	1112.	.272
Oak, red,	——	1075.	.285
Oak, white,	2.21	750.	.296
Pine, Georgia,	——	1274.	.425
Pine, pitch,	——	813.	.278
Pine, red,	.33	781.	.228
Pine, white,	1.24	858.	.219
Pine, yellow,	2.17	925.	.250
Spruce,	1.63	783.	.245
Sycamore,	——	519.	.259
Walnut, black,	2 36	842.	.375
Iron, average cast,	11.00	7835.	1.037
Iron, best cast,	14.10	11450.	1.250
Iron, common wrought,	——	11000.	1.100
Iron, average wrought,	22.50	12443.	1.199
Iron, best wrought,	——	14250.	1.300
Steel, cast,	45.67	14331.	2.240

ARCHITECTURAL FRENZY IN THE NEW WORLD.

ON this side of the Atlantic the miscellaneous Anglo-Saxon writer of our latter part of the nineteenth century has been pleased from time to time to run amuck upon architectural questions in a most peculiar way; not at all in an unintellectual or inartistic way, but in a way which might be called, if we were so minded, by any one of half-a-dozen handy phrases suggestive of lightheadedness. Fun has of course been the principal weapon in his hand; and sometimes very good fun it has been of its kind, hitting hard and straight at the mark; but inasmuch as the mark has been quite as often a delusion as not, and still oftener at least a whimsey, it cannot be said that the practical result has been worthy of the expenditure of so large an amount of wit. Architects as a rule do not trouble themselves to read with any marked attention such disquisitions concerning their business. The public at large also, who are the employers of the architects, are still less disposed to flounder through the obscurities of the argument. Practical men perform their practical work in the old way; and, from the brilliant transcendentalism of Mr. Ruskin to the prosaic infatuation of the inventor of the "Inspired Mason" in the *Quarterly*, the assault has entirely failed, and the design of our buildings is very much what it would have been if Grub Street had left it alone.

It need scarcely be observed, however, that the fever of hypercriticism is a contagious disease; and accordingly no one need be surprised to find the *North American Review* publishing a lengthy and excited article in which an American writer denounces American architecture in the same style of rhetoric with which we are familiar in England. The writer is Mr. Clarence Cook, and such of our readers as have returned from their holiday in a sufficiently pleasant humor may have enjoyed not a little the racy extract which we reprinted last week from this gentleman's essay. Those who have not yet read it we recommend to do so without further loss of time, for the lesson it teaches is indeed instructive as well as amusing.

It will thus be seen that in the United States, as in England, the architect is easily proved to be a sad blockhead, and his work very sorry stuff. The leading point in the American reviewer's argument is, as many might suppose, although many might not, a reference to the superior genius of antiquity. This artifice is pretty much exhausted in England; but it is new in America, and very propably may prove highly attractive there. On this side the ocean, not only have we ceased to hark back to Greece and Rome, or even to new-born Italy, but our own stately monks and saintly freemasons of the Middle Ages — if stately and saintly they really were — we have at length in some degree consigned to the same limbo of exhausted fashion; and what we have come to fancy now more than all else is the higgledy-piggledy of the Stuarts. Now if it happens that there is Stuart architecture of as veritable a kind on the other side as there is on this, it is plain without explanation that such art must happily combine in that part of the world the two great critical virtues of antiquity and fashion. That is to say, when we in England go back to the invasion of Norman William and his rowdy followers, the corresponding reference in America is to the grim and sober-sided people who "came over in the *Mayflower*," seeking refuge, it will be remembered, in the wilderness from the theological discipline of King Charles of jovial but disreputable memory; and so we may expect to find the architecture of the Pilgrim Fathers to be authen-

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tic "Queen Anne." Not only so, but when the old Hollanders built New Amsterdam — the city which some of our readers may require to be told is now called New York — it must be equally true that their architectural style would be of very much the same type. Accordingly, when Mr. Clarence Cook conceives the happy thought of appealing to "the handsome houses in Gloucester, Hingham, Cambridge, and other Massachusetts towns, the houses that made old New York so dignified a city, and those that still give to little Newport an air of consequence," he is not only in the fairest possible manner putting Knickerbocker in the place of William the Conqueror, but he is at the same time accepting for Queen Anne here Queen Anne there — a proceeding which is doubly convenient, interesting, and authoritative. But the transatlantic critic is far too acute to stop here, as an Englishman might do — at least, any other Englishman than such a one as the discoverer of the Inspired Mason. Those delightful examples of antique art, he says, "were the work of simple 'builders,' who knew their trade and never cared to give themselves a finer name." Very likely they were; and what then? The conclusion is obvious. "Where architects abound," he continues, "the art of building always deteriorates. Did architects design the houses of Venice? Architects may have designed the bad ones, but never the good ones. As soon as architects got themselves fairly established in Venice, her shabby days began." With all respect for the humor of Mr. Clarence Cook, we are bound to suggest that he is here drawing upon his imagination for his facts. If he merely intends to assert that the work of the Renaissance in Venice is inferior to the pre-Raffaelite work, that is a matter of opinion which for a good many years has been held to be beyond the range of profitable argument, people of different artistic proclivities being entitled so far to agree, or disagree, to differ. But our critic goes on to illustrate his meaning a little further: "Consider the cottages of England, the châlets of Switzerland; is it not evident that they are the spontaneous outgrowth of a general good taste" and so on? Consider, of course, the lilies of the field, how they grow; they toil not, neither do they spin; yet Solomon in all his glory is not arrayed like one of these. "Every old church in England looks built by the same hands that built the old houses that nestle about it." A pretty fancy, we grant, especially for an American; a tender thought, by no means to be discouraged or disparaged; or we might be obliged to urge the reflection that three score years and ten would have to be repeated in some instances a good many times before the same hands that had begun their work upon a village church of the twelfth or thirteenth, or even the fifteenth century, could have finished it upon the poor slap-dashed dwellings that are rickety and old in the eighteen hundred and eighties, after an existence of scarcely a century and a half. The identification is in truth no more than a recognition of the fact that distance still lends enchantment to the view; once beyond the limits of substantial common sense, and it matters not whether the quaintness of such old houses be that of a hundred years or that of a thousand. But whether this is sound criticism, or even intelligent archæology, is quite another question. "It is to architects," continues the new apostle at any rate, "that we owe all the ugly building that offends us;" and this is the proposition which he wishes to demonstrate by such reasoning. It is true that it could scarcely be demonstrated by any other.

After our own manner, but with a freedom of personal animadversion which no Englishman could hope to emulate, and which is therefore all the more refreshing, Mr. Clarence Cook, having thus laid down the law, proceeds to exemplify its operation by describing the actual specimens of architectural art which claim to be most popular in his great country. "A builder," he observes, more in sorrow, but a good deal in anger, "must call himself an architect before he can be employed in any important work to-day. The man — I forget his name —" (what a pity he forgets his name!) "who built Mr. A. T. Stewart's house and iron shop, and many a structure beside, was called an architect." Architects also — with forgotten names — have built certain churches about Boston; "and another architect built the church in that Back Bay quarter, dedicated, we suppose, to some female saint, since it has for emblem on the top the completest Saratoga trunk" — and so on; a Saratoga trunk being, it is to be supposed, the very large travelling box, and nothing else, in which an American fine lady takes her dresses to the famous springs. Still another architect has built "the Art Museum, so finikin fine," which is adorned with "heads of great men looking out of portholes in the most shipwrecked fashion, a senseless treatment borrowed from that overdone Pavian Certosa." "Borrowing, borrowing everywhere!" is the Carlylese cry of the critic, "an original motive almost impossible to find;" and now there follows at last this suggestive reflection: — "For the people at large have no ideas on the subject; the 'builders' have been snubbed into taking a back seat and keeping it; and in architecture, as in all our fine arts, notably in the art of painting, the field has fallen into the possession of *a set of clever, accomplished, but over-cultivated young men*, who have come back from French and English studios, offices, and pedestrian trips, with a plenty of 'material' in their sketch-books," which, in short, although all very well in its way, is of no use in America. But why of no use in America?

Mr. Clarence Cook, whether in affectation or in reality, seems to be only playing the part, after all, of one of those growling patriots who are to be met with in every land, and whose simple and easy function it is to cry up the imaginary excellence of the "good old times." Fancy this old-maidish whim having at length got so far as to insist upon the worship of such an idol as the architecture of the godly men who "came over in the *Mayflower!*" Fancy the churches of all America tied down forever to the pattern of the conventicles in which Cotton Mather expounded the mysteries of witchcraft! We venture to express the hope that American architects will pay no attention to Mr. Clarence Cook; that the clever and accomplished young men who have gone home from French studios and English offices, with "a plenty of material," will by no means consent to imitate the barren work of primitive Yankee builders, but go on their way rejoicing in the fact that they are doing good work for their country, and better and better every day. — *The Architect.*

LIGHTNING CONDUCTORS.

A COPY of rules for the erection of lightning conductors, based upon the recently-published report of the Lightning Rod Conference, has, with the accompanying covering letter, been recently issued by the Explosive Department of the Home Office to the occupiers of all factories and magazines for explosives, and to those local and police authorities upon whom devolves the inspection of stores of explosives:

HOME OFFICE, WHITEHALL, LONDON,
September 1, 1882.

Sir, — The accompanying code of rules for the erection of lightning conductors has been abstracted (nearly verbatim) from the recently-published report of the Lightning Rod Conference. This Conference was assembled at the instance of the Meteorological Society, and included delegates from that body as well as from the Royal Institute of British Architects, the Society of Telegraph Engineers and of Electricians, and the Physical Society. There were also attached to it two distinguished scientific men. Permission to print and circulate this abstract has been courteously accorded by Mr. G. J. Symons, F. R. S., President of the Meteorological Society, who acted as secretary to the Conference and editor of the report. The carefully-considered opinions of such a representative body of scientific men, based upon a mass of practical as well as theoretical evidence, cannot fail to command the very attentive consideration of all persons specially interested in the subject of lightning conductors. Among those who are so interested may be specially named the occupiers of factories and magazines for explosives. On these grounds, and in view of the fact that the report as a whole may not have come under your notice or be readily accessible to you, I venture to forward a copy of these rules, and to accompany the same with the expression of a hope that you will give them the consideration to which they are entitled, and will take such steps as may seem expedient to you in regard to bringing your system of lightning conductors as far as practicable into conformity with the principles therein enumerated. These principles should, I consider, guide this Department in forming an opinion as to the efficiency, or otherwise, of the lightning conductors which may come under our official observation. I have the honor to be, your obedient servant,

V. D. MAJENDIE, Colonel,
H. M. Chief Inspector of Explosives.

The following are the rules referred to in the above letter: —

1. *Material of Rod.* — Copper, weighing not less than 6 oz. per foot run, the electrical conductivity of which is not less than 90 per cent of that of pure copper, either in the form of rod, tape, or rope of stout wires, no individual wire being less than No. 12 B. W. G. (.109″). Iron may be used, but should not weigh less than 2½ lbs. per foot run.

2. *Joints.* — Every joint, besides being well cleaned and screwed, scarfed, or riveted, should be thoroughly soldered.

3. *Form of Points.* — The point of the upper terminal[1] of the conductor should not have a sharper angle than 90°. A foot below the extreme point a copper ring should be screwed and soldered on to the upper terminal, in which ring should be fixed three or four sharp copper points, each about six inches long. It is desirable that these points should be so platinized, gilded or nickel-plated, as to resist oxidation.

4. *Number and Height of Upper Terminals.* — The number of conductors or upper terminals required will depend upon the size of the building, the material of which it is constructed, and the comparative height above ground of the several parts. No general rule can be given for this, except that it may be assumed that the space protected by the conductor is, as a rule, a cone, the radius of whose base is equal to the height of the conductor from the ground.

5. *Curvature.* — The rod should not be bent abruptly round sharp corners. In no case should the length of a curve be more than half as long again as its cord. A hole should be drilled in string-courses or other projecting masonry, when possible, to allow the rod to pass freely through it.

[1] The upper terminal is that portion of the conductor which is between the top of the edifice and the point of the conductor.

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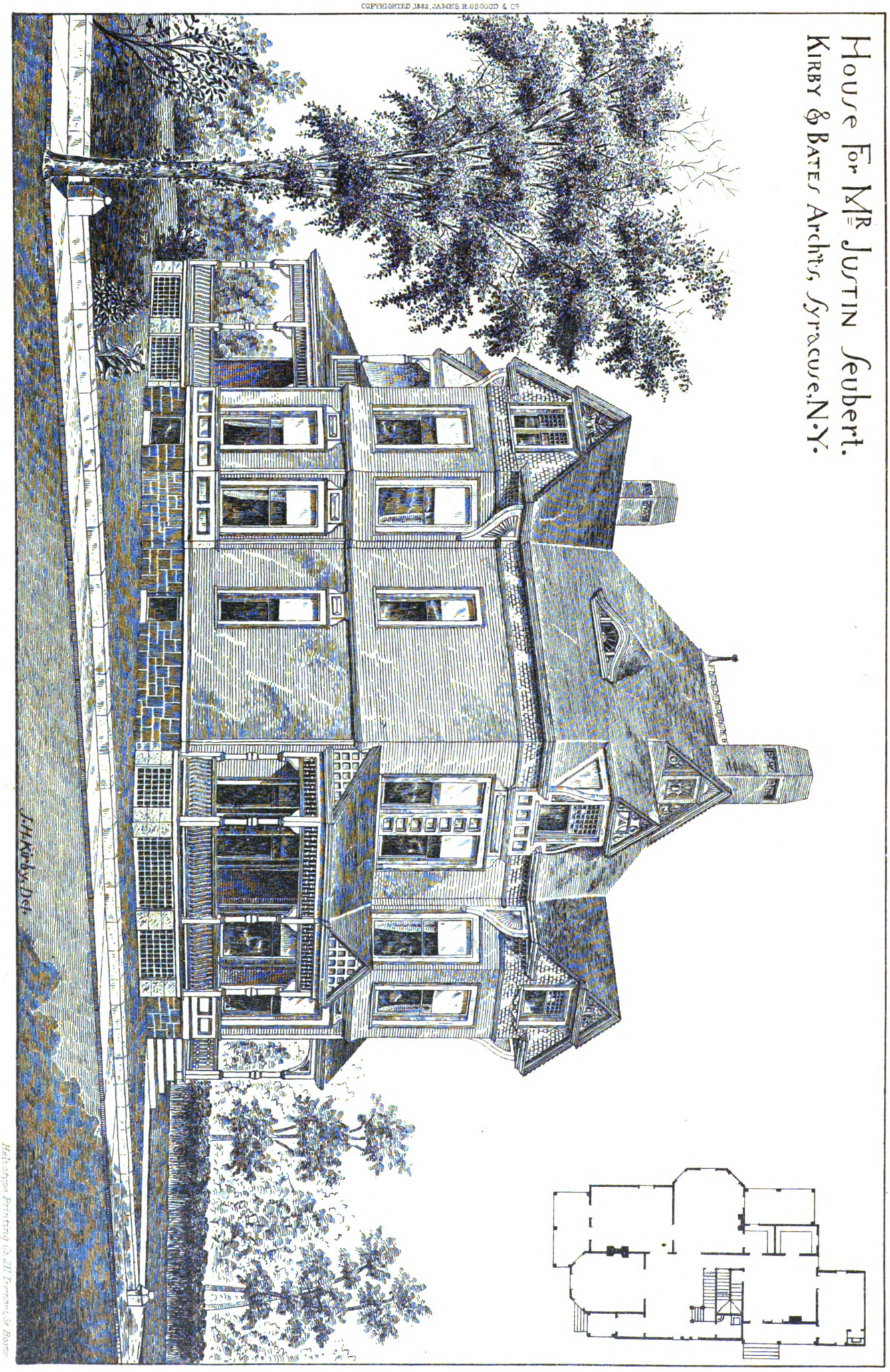

HOUSE FOR MR. JUSTIN SEUBERT.
KIRBY & BATES Archts, Syracuse, N.Y.

J.H. Kirby Del.

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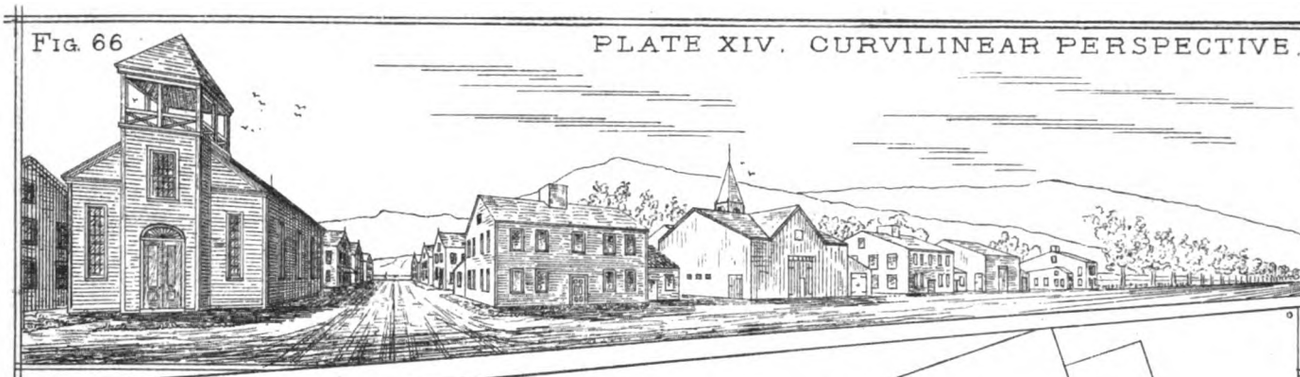
Fig. 66

PLATE XIV. CURVILINEAR PERSPECTIVE.



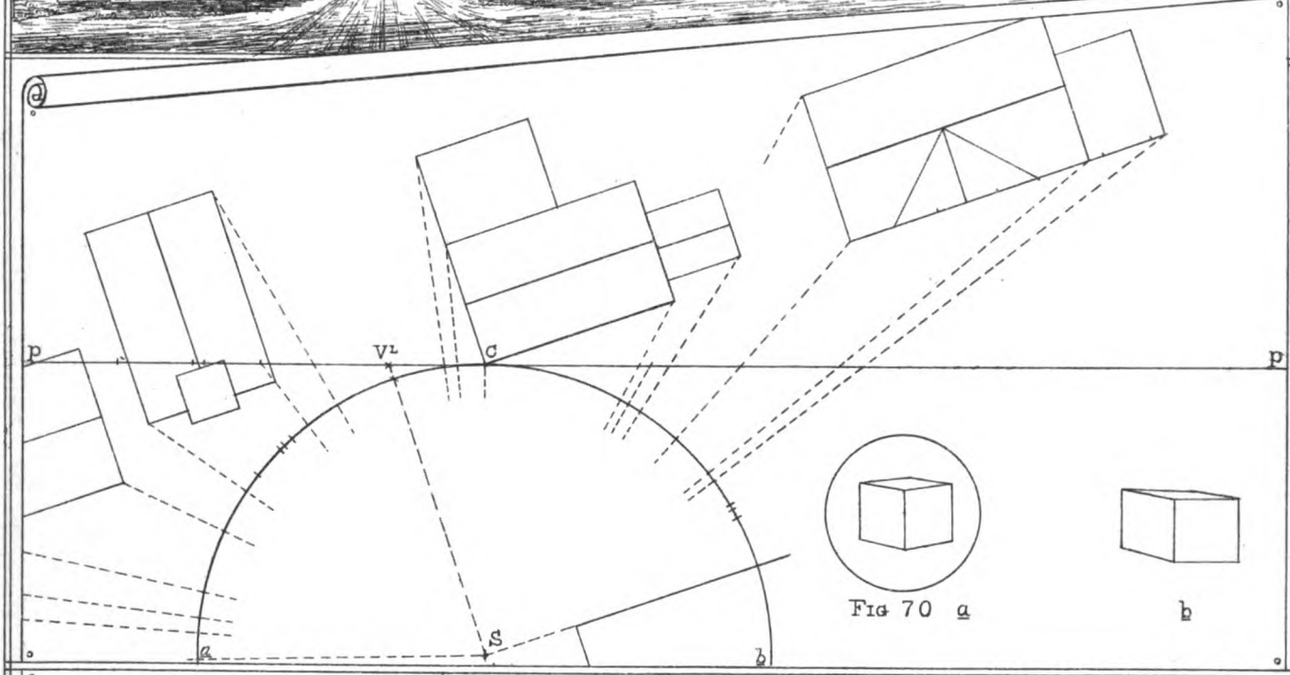


Fig 70 a

b

Fig. 67

Fig. 68

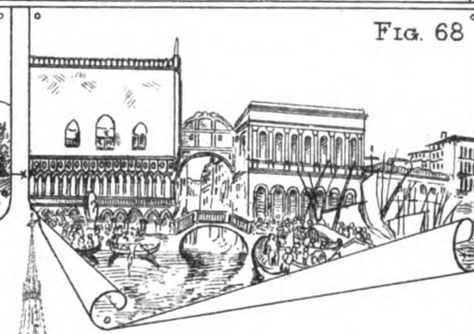


Fig. 69 (Copied from Herdman's Curvilinear Perspective.)

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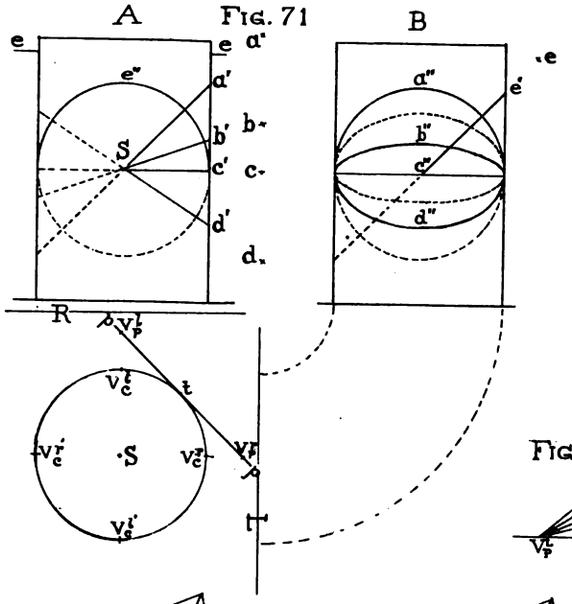

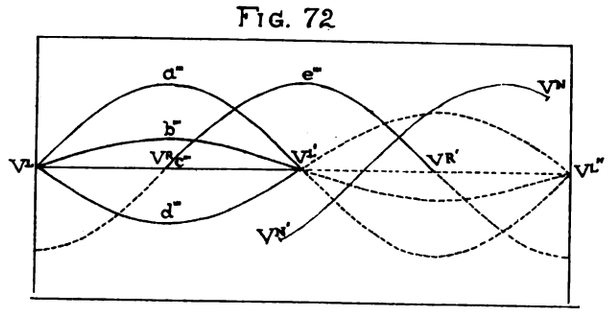

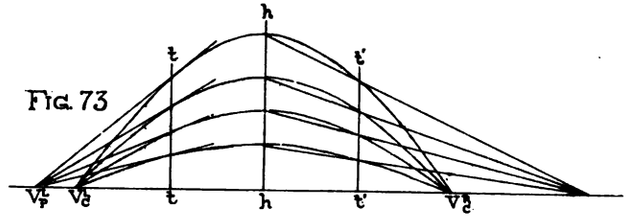

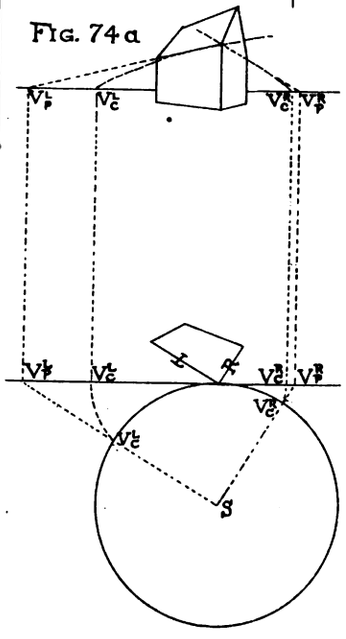

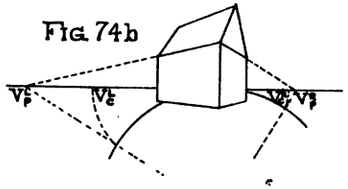

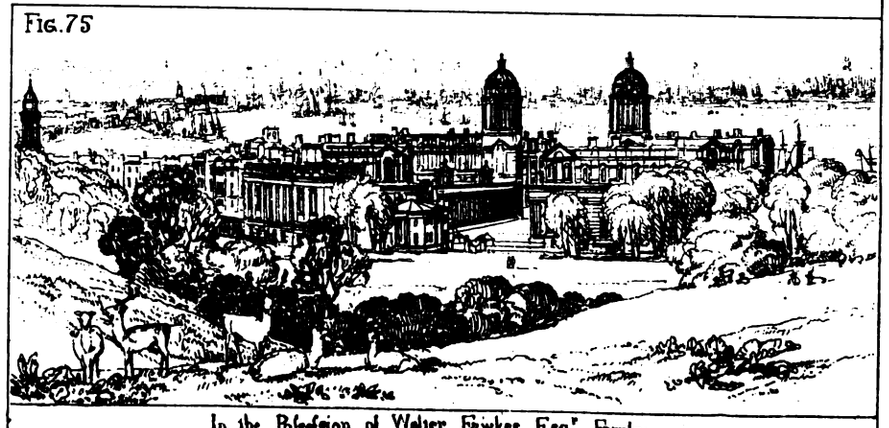

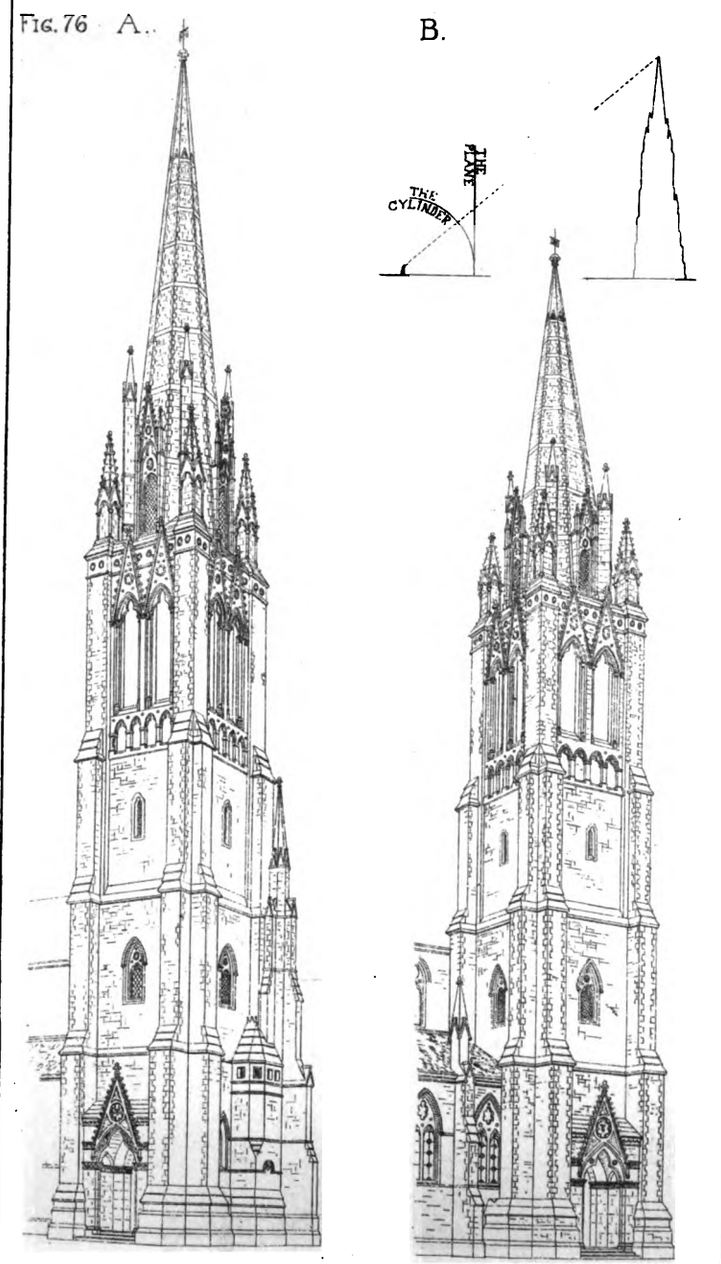

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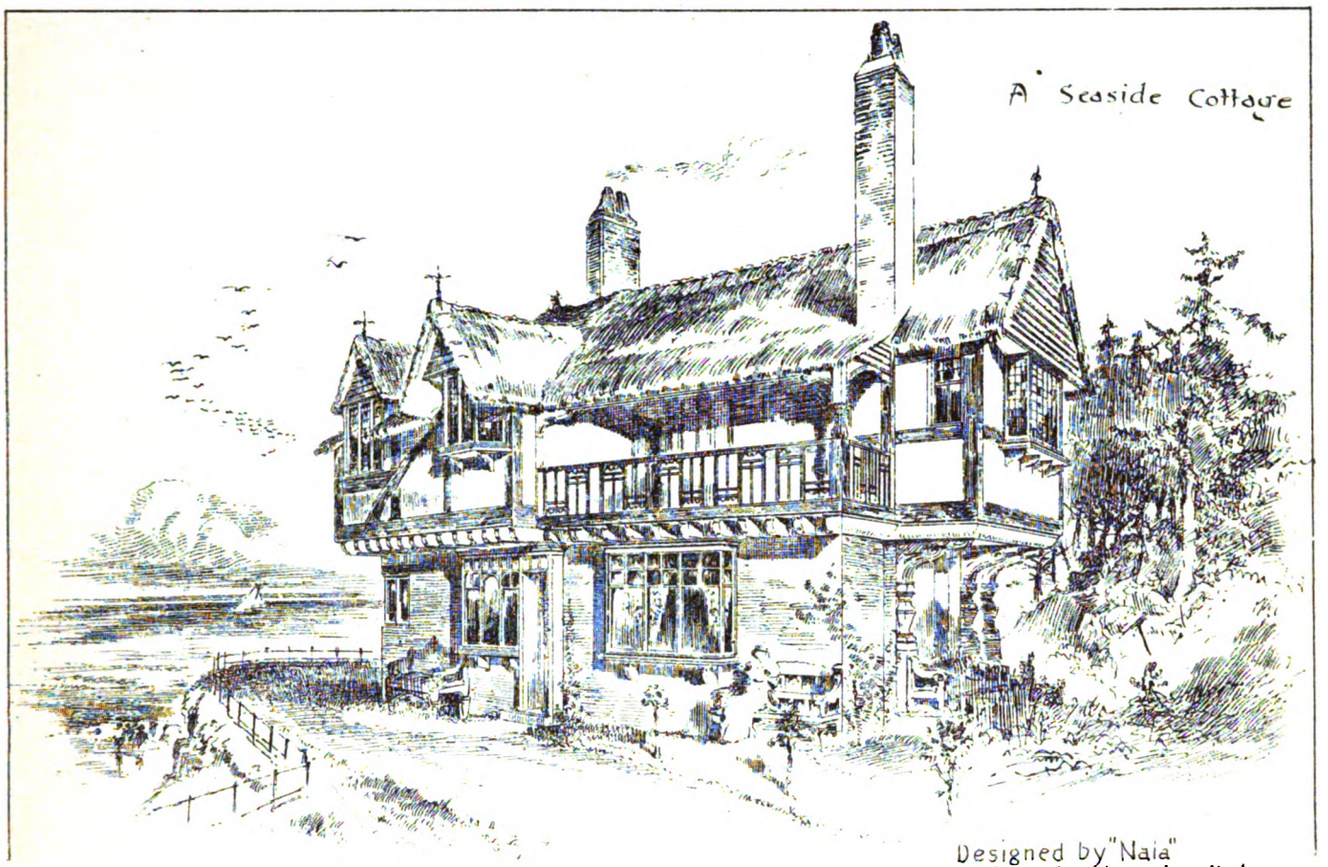

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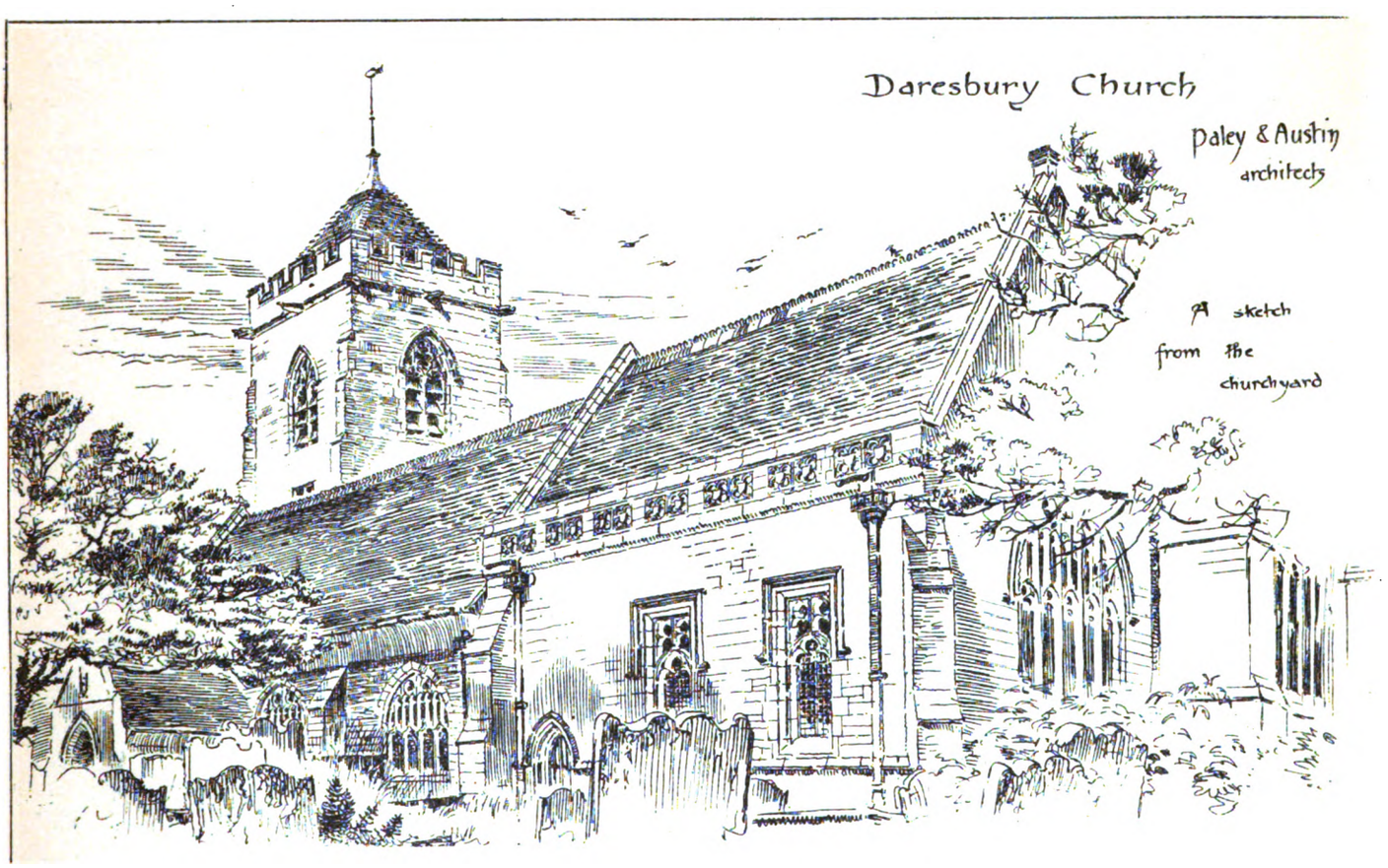

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Rambling Sketches,
by T. Raffles Davison.

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6. *Insulators.* — The conductor should not be kept from the building by glass or other insulators, but attached to it by fastenings of the same metal as the conductor itself is composed of.

7. *Fixing.* — Conductors should preferentially be taken down the side of the building which is most exposed to rain. They should be held firmly, but the holdfasts should not be driven in so tightly as to pinch the conductor or prevent contraction and expansion due to change of temperature.

8. *Other Metal Work.* — All metallic spouts, gutter, iron doors, and other masses of metal about the building should be electrically connected with the conductor.

9. *Earth Connection.* — It is most desirable that, whenever possible, the lower extremity of the conductor should be buried in permanently damp soil. Hence proximity to rain-water pipes and to drains or other water is desirable. It is a very good plan to bifurcate the conductor close below the surface of the ground, and to adopt two of the following methods for securing the escape of the lightning into the earth: (1) A strip of copper tape may be led from the bottom of the rod to a gas or water main (not merely to a leaden pipe), if such exist near enough, and be soldered to it; (2) a tape may be soldered to a sheet of copper, 3′ x 3′ x $\frac{1}{16}$″ thick, buried in permanently wet earth and surrounded by cinders or coke; (3) many yards of copper tape may be laid in a trench filled with coke, having not less than 18 square feet of copper exposed.

10. *Protection from Theft, etc.* — In case where there is any likelihood of the copper being stolen or injured it should be protected by being enclosed in an iron gas-pipe, reaching 10 feet (if there is room) above ground and some distance into the ground.

11. *Painting.* — Iron conductors, galvanized or not, should be painted. It is optional with copper ones.

12. *Inspection.* — When the conductor is finally fixed it should in all cases be examined and tested by a qualified person, and this should be done in the case of new buildings after all work on them is finished.

Periodical examination and testing, should opportunities offer, are also very desirable, especially when iron earth connections are employed.

THE ILLUSTRATIONS.

WE reproduce from Part IV of "Rambling Sketches," full particulars concerning which publication can be found elsewhere in this paper, these two sketches: —

RAMBLING SKETCHES, BY MR. T. RAFFLES DAVISON. DARESBURY CHURCH. — A SEASIDE COTTAGE.

There was an ecclesiastical structure at Daresbury in the fifteenth century, for in the year 1448 Richard Baynster, variously described as of Chester and of Hesketh, in Lancashire, and Thomas Walton, of Westminster, were convicted of stealing from it a missal and some silver plate. Baynster is styled a "gentleman" and his confederate a "yoman." They were not vulgar thieves, but mediæval kleptomaniacs, with a special fondness for church plate. They were also men of some learning, for to escape the gallows they pleaded "benefit of clergy," and that custom, so curiously evidencing the regard in which our ancestors held learning, even when dissociated from good manners, was apparently the means of saving their lives. The present church of Daresbury, with the exception of the tower, is a restoration by Messrs. Paley and Austin, and was erected chiefly at the expense of Sir G. Greenall and Mr. W. E. Jones. The architecture of the original building was pointed. There were modern windows, and the south aisle was rebuilt in 1773. The present structure has an exceedingly picturesque appearance.

DIAGRAMS ILLUSTRATING CURVILINEAR PERSPECTIVE. — PLATES XIV, XVI.

HOUSE FOR JUSTIN SEUBERT, ESQ., SYRACUSE, N. Y. MESSRS. KIRBY & BATES, ARCHITECTS, SYRACUSE, N. Y.

COLOGNE CATHEDRAL. — Permission has been obtained from the German Emperor for the opening of another Cologne Cathedral lottery to raise money with which to purchase the houses at present incumbering the cathedral square. It is the intention to demolish these houses in order to afford a free, open space of proper and worthy size for the cathedral.

WOOD STAINING. — A novel system of staining wood has been introduced that has the merit of simplicity and cheapness. The wood having been carefully planed and finished, it is given two thin coats of sizing. This is prepared by adding to glue a small quantity of albumen and alum. When this is dry and hard, the design is painted or stencilled upon the wood, the intention being to produce a pattern, one part of which shall be of the natural color of the wood, the stencil or the design selected representing the white parts only. For instance, if the finished work is to show white figures on a dark ground the white parts only must appear to the stencil. When the sizing is dry the pattern is painted on in Canada balsam or Brunswick black. When the balsam is hard and dry the whole suface is washed with a sponge and hot water. This will remove the sizing from all those parts of the wood not protected by the hard balsam, which resists the warm water. When the wood is dry the exposed parts are stained in imitation of walnut or other dark woods. When the staining is finished the balsam is removed by brushing it with turpentine, leaving the pattern or design in the natural color of the wood on the dark, stained ground. The finished work is said to resemble closely inlaid wood. — *Exchange.*

THE TENACITY OF INDIAN CUSTOMS.

MR. FRANK H. CUSHING has finished the work at Washington upon which he has been engaged since his visit to Boston with his Zuñi Indians last spring, and has now returned to Zuñi, where he will pursue his investigations for at least three years more. Mr. Cushing, with his young wife, was warmly welcomed to Fort Wingate, near Zuñi, by his friends there, and on his journey westward he was received with exceptional distinction and courtesy. While at Washington, in midsummer, the two Indians who remained with him to assist him in his work at the Bureau of Ethnology — Pa-lo-wah-ti-wa, the governor, and Nai-iu-tchi, the senior Priest of the Bow — were overcome by malaria from the Potomac marshes in the neighborhood of their lodgings, and Mr. Cushing took them to his old home in New York State, where they speedily recovered.

This New York visit of Mr. Cushing's was signalized by a most interesting experience and a discovery of much ethnological importance. Many readers of the *American Architect* will doubtless remember an article on opportunities for ethnological study afforded young students by our native eastern Indian tribes, printed April 29, 1882. It was occasioned by our meeting a New England Indian on the train at Norwich, while on the way to New York, and Mr. Cushing said: "Wherever there was a remnant of an aboriginal tribe, even though its habits of life might have become radically changed and the purity of its blood destroyed by commingling with other races, there was a promising field for ethnological work, provided its language be kept alive." I remember that he also said that an earnest student might go into any one of the five nations of the Iroquois, and, by adopting methods similar to those which he has pursued at Zuñi, would gain information which would surprise ethnologists, who supposed that all had been learned that was worth knowing about these much-studied Indians. Afterwards at Washington, at the meeting of the National Academy, I heard Major Powell make some enthusiastic remarks on the true methods of ethnological study, at the close of a paper on Zuñi mythology as reflected in their sociology, read by Mr. Cushing. Major Powell took the same ground as to the value of studying any of the small Indian tribes of the East, despised and neglected as they might be, surrounded and apparently overwhelmed by our busy civilization. I had written the article for the *American Architect*, giving Mr. Cushing's views, only a few days before, and it was gratifying to hear the most eminent ethnologist of our country so thoroughly coincide with the ideas of his young disciple.

These have been verified in a striking manner by Mr. Cushing's visit to a New York tribe, whose name is here withheld for obvious reasons of courtesy, although his experiences may be recounted without a breach of confidence. The Indians in question have been in close contact with the whites for more than three generations. So much have they been changed (apparently) by the contact, that few implements or articles of clothing, and no dwellings like those found by the early French missionaries among their ancestors, appear amongst them to-day. They have on their reservation churches of various Christian denominations, school-houses, and other public buildings. Some of them, notably their chiefs and sachems, are thoroughly educated. They number about five hundred. Of this number between three and four hundred speak English very well; some of them admirably. The leaders among them are in every sense progressive farmers, using the steam threshing-machine, the automatic binder-reapers, etc. The resemblance ceases here. Every member of the tribe speaks perfectly the original tongue; the original Gentile, phratral and governmental institutions exist perfectly; the original folk-lore and myths are scarcely broken, although slightly modified.

Most marvellous, however, is the discovery made by Mr. Cushing in relation to their religious practices, beliefs and observances. This was through his position as a Zuñi. "I went there," he writes, "as a Zuñi, with Pa-lo-wah-ti-wa and Nai-iu-tchi; like them I was arrayed in the native costume, ornaments, and significant decorations of the Zuñi. We arrived at the reservation late in the afternoon. We were received by one of the sub-chiefs, and by him immediately directed to one of the grand sachems. Within three hours a council of more than three hundred was assembled with the setting of the sun, in the tribal council-house. Meanwhile, some of the sachems and elders entertained us; after liberally feasting us, conversational speeches of mutual congratulation and inquiry were made by both the elders and ourselves. I was studiously addressed as the Zuñi: the expression being 'you three western brothers,' notwithstanding the fact that some of the Indians remembered me as a

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boy who had purchased baskets and bows from them in the neighboring towns. After congratulatory speeches, inquiries were made relative to our Gentile standing, during which I discovered two new Gentile names — those for the hawk and the bear. This was followed by a guarded inquiry about our songs, *sacred* dance institutions, and mystic medicine practices. Imagine my surprise on learning that the sacred war-dance, the sacred incantation-dances for rain, etc., and above all the medicine ceremonials of an *esotoric* institution *still* existed among these copper-colored Yankees. A discussion of dance (kâ-kâ) paraphernalia called out the enthusiasm of the elders and sachems. A sub-chief was despatched. He immediately returned with a *medicine* mask used in secret ceremonials for the exorcism of disease, identical in function with those used in the kâ-kâ-thal-nâ ceremonials of the Zuñis, although made of wood, and differing, of course, in appearance. These things are jealously guarded from the most intimate American friends of the tribe, are trusted and venerated with almost Zuñi faith, and are used with ancient song and ritual almost as elaborate as are those of the Zuñis. During the night we were entertained by exhibitions of the ancient dances. A white witness of their popular war-dances given at fairs was present through his relationship to me (my father), and pronounced not only the dances he had never seen before, but also even the war-dances performed, as totally new to him, and as different in every respect from the popular exhibitions in question. You see how true it is, that even a people now clad in American garments welcome my adoption of the Indian regalia and life, lay their secrets at my feet in reply to my Indian speeches, and unveil the mystic symbols of three silent generations. And that is what I believed would be the case could even the most unrepresentative speaker of any Indian tongue be properly approached."

This account of Mr. Cushing's is certainly a remarkable demonstration of inherent secretiveness of Indian character, as well as of its conservatism and tenacity of ancient institutions.

One of Mr. Cushing's old friends in New Mexico welcomed his return with a charming tribute in the shape of a poem with one of the most characteristic phases of Zuñi character — their religious steadfastness — as a theme, embodying the stability of their institutions and the devoutness of their faith; also the policy of the early Jesuits and Franciscans in introducing saintly feasts on old Pagan days. Its truthfulness of sentiment and fidelity to scientific traditional and historic fact, make it worthy of reproduction here:

THE PAGAN MARTYRS.

I.

Down from the shady pines of Zuñi Mountains,
By lower hills where stunted cedars grow,
Across the sunny vale where Nutria's fountains
Make green the fields that toiling Indians sow,
And on, o'er sage-grown waste, through gloomy cañyons,
Past ruined towns that fell when Rome was young,
I travelled all the day with my companions
Till length'ning shadows o'er our path were flung.

II.

At length arose to view the lofty mesa
Whereon the ruins of Old Zuñi stand;
Along its beetling front you still may trace a
Pathway to the summit of the table-land;
With reeling head and trembling limbs you 'll scale it,
And gasping at the top you 'll ask in dread,
If once the Spanish soldier dared assail it
'Mid deadly missiles rained upon his head.

III.

"Is this some vast dun rock of lava lifting
Its rugged mass above the withered plain,
Unchanged where restless sands are ever drifting
And restless winds assault its front in vain,
Or is it some enormous ant-hill builded
By giant insects of the mythic days
The Indians tell of, that we now see gilded
By the last touches of the sunset rays?"

IV.

"'T is the strange home where dwells the race of Zuñi,
As we approach it, mark its walls that rise
In terraced heights; its bristling ladders soon ye
Will see revealed against the evening skies."
Our guide thus answered. Daylight waned. We entered
And soon were mingled with the dusky throng
That toward a low and mystic chamber centered
To hear the pagan priests intone their song.

V.

Yes, solemn priests who pray in tongue archaic
The laymen know not: learned priests who hold
A law as ancient as the code Mosaic,
A cult, as that of Baal or Indra, old,
Here in these days when timid adoration
To one far God, with silent doubt contends
And spoken unbelief — in this wise nation —
The pagan priest his blazing altar tends.

VI.

And oh! Have none, with valiant Paul's devotion,
The joyful Tidings hither dared to bring,
In all these ages since, across the ocean,
Came the first vessels of the Spanish king?
Aye, long ere Plymouth's forests heard the singing
Of Pilgrim voices lifted to the Lord,
The Spaniard sought the "Seven Cities" bringing
The Cross; but bringing, too, alas! the Sword.

VII.

Then came the sorrowful and weary ages.
Though History hold his Vandal deed a crime,
'T is well, perhaps, the *Gringo* burned the pages
That bore the annals of that fearful time.
Though still so many records of the errors
Of Spanish rule remain, they 've not sufficed
To tell an hundredth part of all the terrors
Wrought in the honor of the peaceful Christ.

VIII.

Scourged to the portals of the gloomy mission,
Whose slanting walls now crumble to decay,
Came these reluctant children of Perdition,
With sullen hearts to kneel but not to pray;
For what, to them, the Deity supernal,
Who loved, they heard, their cruel masters well —
Shared with such monsters for a life eternal,
His promised Paradise were worse than Hell.

IX.

So, not for images with pallid faces
Would Zuñi's sons their swarthy gods despite
Nor take the proffered bargain which replaces,
With feast of saint, a day of pagan rite —
(Such saint as they of Acomà believe in;
For there the Indian sings his song of praise,
Where the fair statue of the Royal Stephen
Supplants the war-god of the ancient days).

X.

Though well they knew the doom of death was meted
To him who in idolatry was found,
They oft, in stealth, to deserts far retreated,
Or met in nature's temples underground;
And there they taught their children tales of wonder
And all the secrets of the priestly line;
On high Toyálani, the Mount of Thunder,
They laid the gifts at Ahayùta's shrine.

XI.

But Faith, long-suffering, is at last victorious;
And praise, to-day, the old-time gods they sing,
No more in trembling, but with voice uproarious,
Safe 'neath the shelter of the Eagle's wing.
Bright are the fires in the *estufas* lowly,
Quenched are the tapers in the Christian fane,
Where now the stranger spoils the altar holy,
No longer guarded by the arms of Spain.

XII.

"Thou stiff-neck'd generation, self-deceiving,
May Heav'n enlighten thee!" — my reader prays.
"Punish their obstinacy, unbelieving" —
Thus ran the orders of viceregal days.
Ah, had the persecutor been the heathen
And he who died for faith the Christian been,
In lauding orders of that time had we then,
Some other word than "obstinacy" seen!

XIII.

Oh, Christian sage! Oh, maiden tender-hearted,
Whose eyes are streaming in the silent room,
O'er the sad page that tells of saints departed —
Of Alban's fate — Lorenzo's fiery doom!
Have ye but words of doubting for the story,
Have ye but scornful glances for the plaint
Of him who sings the pagan martyr's glory,
Who sings the sorrows of the savage saint?

It would be strange if anybody should attain a position so conspicuous as Mr. Cushing's and escape calumny, and, indeed, it has not been his fate. Ever since his return to Washington attempts have been made to discredit the sincerity of the object of his visit to Boston, and statements to this effect have been repeated so persistently that many have given them credence. It has been asserted on authority of Pedro Pino, the aged Zuñi who was left in Washington at the time of the Boston trip by reason of his illness, that Mr. Cushing was a liar, that the Zuñis knew nothing of "the water from ocean of the sunrise;" that they took their gourds along to drink from, but that Cushing made them go to the ocean and sacrifice, chant, and pray; made them take the water therefrom and throw it away; that the Zuñis had no religion, and that the fine speeches Cushing had made were of his own invention, and much similar stuff. Now Pedro Pino is over eighty years old and little better than an imbecile, therefore had he really said what has been ascribed to him it would have no weight whatever. It is also to be borne in mind

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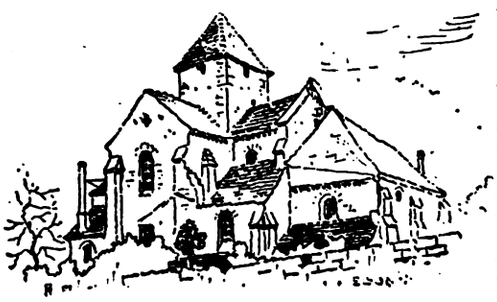
that Pedro Pino's questioners could have no knowledge of Zuñi language; that, on the other hand, his knowledge of Spanish is by no means profound, and that is the only other tongue he speaks. Therefore it would be the easiest thing in the world for an "interpreter" to misinterpret his meaning. Moreover, Pedro Pino has himself characterized the stock of tales which the Zuñis always have at ready command for the benefit of outside questioners into their national or personal affairs as "lies for strangers." Therefore it may be seen that evidence resting upon such a flimsy fabric of fact has an exceedingly unsubstantial basis. Imagine for an instant that eminent scientists like Professor Baird and Major Powell of Washington, Professor Putnam of Cambridge, and Professor Morse of Salem, and historical scholars of the rank of Francis Parkman and Edward E. Hale,—all of whom have the most implicit confidence in Mr. Cushing—could be thus hoodwinked, and to imagine an adequate motive to induce Mr. Cushing to make the attempt, and thereby to account for the privations and suffering he has undergone in the pursuit of his work, would require a credulity monumental in degree.

SYLVESTER BAXTER.

A FOOLISH SPECIMEN OF COMBUSTIBLE ARCHITECTURE.



UPON one of the principal streets of a certain city which need not be named a building is in process of construction apparently intended to be used for office purposes, as it is divided on each floor into small rooms, many of which are to be heated by steam radiators, and have no outlet for ventilation except the doors and windows. The placing of these steam-pipes has made excellent quarters for the nurseries of rats, but comfortable quarters are elsewhere provided for this purpose, perhaps in a more complete way, as will presently be described.

This building has a very solid stone front of excellent design and a very heavy side-wall of brick. It is on a corner. Consideration has been given to the danger of fire, and every top floor is laid upon a thick bed of mortar. It would be probable that all the furniture of an office would be consumed without any danger of the fire passing downward through this floor, whatever it might do elsewhere. In solidity of wall and safety of floor, of its kind, the construction leaves nothing to be desired. The hollow spaces between the floor and the ceiling on each story would not be a matter of any great moment except for the passage of steam-pipes (not sufficiently guarded) and for other reasons now to be given.

The inside walls of this building are plastered upon lath nailed to studding about 2″ x 3″, and the studding is set a little away from the walls and farther away from the chimneys. This makes the interior structure a separate combustible building of wood, presenting a wooden surface next to the wall which screens it, of sawed stuff showing the largest possible number of corners ready to catch fire. There is no cut-off and no break from cellar to attic in the space between this wooden building and the stone and brick screen by which it (this wooden building) is protected from water, and although the roof of the building is flat, the attic ceiling is hung several feet away from it, making an admirable combustible space to which a fire may be carried from the cellar or from any floor, between the wooden building and the incombustible screen, and where it may do its utmost work of destruction well out of the reach of the firemen.

There are a few fireplaces in the building, and where they are the chimney is wider than throughout the rest of its course. Over each fireplace, therefore, on one side, and screened by a vertical furring, is the best possible warm wooden chamber for the nurseries of rats; and as the building is not far from the wharf they will doubtless find their way to these warm and comfortable quarters as soon as the carpenters have left the premises. Quite recently the wharf rats took advantage of similar quarters which had been provided in a building not far from the one described herein, where they used the waste with which oily machinery had been wiped for their nests, and when this building burned the loss was about half a million dollars, with a narrow escape from serious loss of life.

Being intended for offices, the building now under consideration will doubtless be finished in hard wood. This will require frequent cleaning and oiling; and the incendiary rags which are commonly used for these purposes will be taken by the rats into their nurseries, and used as they customarily are, to make their nests. All the conditions will then be present (as they are in most of what purport to be stone churches) for the incendiary rat or the treacherous steam-pipe to set the building on fire.

Not long since one section of the building in part occupied by the undersigned was set on fire by a rat's nest in a coal-hole under a stairway next to a room in which the finish had lately been oiled. It passed from the second floor nearly to the roof behind the furrings on a party-wall, and was put out by the use of a chemical engine.

An expenditure of one hundred dollars or less, at the present time, would remedy all the defects in this building. Cut-offs of brick or of mortar could be carried around each floor and around each chimney, by which the circulation of flame and of vermin would be wholly stopped; and the fire might then be retarded in the room or upon the floor where it occurred, if it ever occurred, until the firemen could put it out.

This is now the state of the question: so far as the firemen and the fire engineers are concerned, it is held to be their business only to put out a fire, not to prevent one by criticising construction; and in some cases where they have gone beyond their function they have been rebuked for interference with what was none of their business.

It is the business of the inspector of buildings to attempt to prevent fires so far as the present statute gives him authority. The present building act of the city in question actually requires, in some of its provisions, unfit and dangerous methods, and totally neglects many of the principal causes of danger, like those described above.

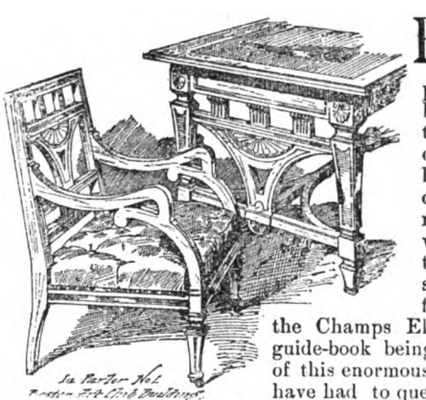
It is the function of the underwriter to bet on the chances of bad construction; and the range of stakes or premiums under such bets or policies having become unprofitable of late, a heavy rise in the rates is now being enforced as a matter of necessity.

It might be the function of a citizen to designate this particular building and to point out its faults; but in so doing it is alleged that he may render himself liable in damages both to the owner of the building and to the architect, inasmuch as the building is constructed within the limits of the law.

Two questions arise: First, how can the present method of combustible architecture be rendered a disgrace to the architect? Second, how shall loss by fire be made to fall upon the owner who neglects or is ignorant of the simple methods of assuring comparative safety?

E. A.

THE ARC DE TRIOMPHE, PARIS.



FOR some three months past English tourists and provincial visitors have been surprised to find the Arc de Triomphe de l'Etoile surmounted by a huge scaffolding of irregular shape and rough construction which effectually destroyed the beauty and symmetry of the magnificent pile at the top of the Champs Elysées. The ordinary guide-book being silent on the subject of this enormous excresence, travellers have had to question the guardian at the bottom of the stairs, who must since last June have given many thousand answers to the question: "What are they building at the top of the Arc de Triomphe?" The unfortunate man who has thus been interrogated from morning till night by visitors from every clime and with every known kind of foreign accent, is himself rather vague on the subject, and usually only volunteers the information that "They are putting up a group of statuary." The fact is that the scheme, often proposed since the erection of the gigantic archway, of surmounting it with an allegorical group is at last being carried into execution, and the work in its elementary stage is fast approaching completion. When first erected the triumphal arch, with its rich bas-reliefs and bold groups of statuary commemorative of the glories of the first empire, was intended to form the basis for a crowning decoration of sculptor's work. The fact is proved by the 'turtle's back" platform which has all along spoiled the outline of the magnificent parapet running round the top of the erection. Various designs were offered during the first half of the century, but most were rejected on account of their absurdity or want of striking effect. One sculptor wanted to surmount the arch with a bronze eagle of gigantic dimensions, using the platform as a perch. Another genius more patriotic wished to see a huge "France" sitting on a lion, receiving the submission of the other four great powers, including of course "perfide Albion." This plan was discarded, possibly because, even in the pages of French historians, no occasion could be found on which England had to bow down to her amiable and glory-loving neighbor.

M. Falguiere, it is who has at last prevailed upon the authorities to allow his design to grace the Arc de Triomphe. As far as one can judge from its at present unfinished state, the group will turn out a decided success, and an important addition to the many beauties of the capital. The difficulties of the task were obvious, for it must be remembered that, in addition to the twelve roads leading directly to the Arc de Triomphe and each offering a different point of aspect, the huge pile can be seen from almost any spot in the western environs of Paris. A group had to be imagined, therefore,

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which would look well from every point of the compass—a consideration of infinitely more importance than the choice of a subject. Whether M. Falguiere has been successful in forming a striking and harmonious outline for his group will not be quite evident until all the scaffolding has been removed; but at present there is no reason to doubt this. The design itself consists of a female figure of France standing erect in a Roman chariot and holding a half-furled flag in her left hand. Four horses abreast, majestically throwing out their fore legs toward the front corners of the arc, draw the car, each outside pair being led by a female figure of Progress. In the foreground is a group representing Liberty overcoming Official Tyranny, the back of the platform facing the Avenue de la Grande Armée being occupied by two allegorical group of figures illustrating the defence of the country. These latter are not yet commenced. The figures now erected are of course only the models serving to show the general design of the artist, which, if accepted, will be definitely carried out in bronze. The cost of the temporary erection—about £2,000—is very low, and the economy with which the group is being constructed reflects great credit on the ingenuity of the artist. Horses, figures and chariot are, in fact, simply made of old planks of wood nailed together, the intervening spaces being filled in with wire netting, and the whole covered with coarse canvas steeped in liquid plaster, and subsequently painted brown to represent new bronze. Anything cheaper than this it would be impossible to devise; yet the effect is very good, and the model will fully answer its purpose. Thirty-five workmen are employed by M. Falguiere, who would have completed his gigantic task some weeks ago but for the stormy, wet weather which at times made work at such an altitude not only difficult but very dangerous. When fully exposed to view the group will doubtless encounter much opposition, especially from old Parisians, who love their great monument for its own sake, and are not unnaturally averse to what they term an innovation. It is certain, however, that the arch when designed early in this century was intended to receive a final crown of statuary.—*London Telegraph.*

SIXTEENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE final programme has been issued by the committee of arrangements for the Sixteenth Annual Convention of the American Institute of Architects, to be held in the city of Cincinnati on the 25th and 26th inst.

The opening address will be delivered by Col. George Ward Nichols, of Cincinnati, after which will follow the report of Board of Trustees, by Mr. A. J. Bloor, Secretary; reports of the Treasurer, Mr. O. P. Hatfield, and of the Committee on Publication and the Committee on Education. A paper will be read from the San Francisco Chapter. The foregoing, together with the election of officers, will probably take up all the time allowed for the morning, afternoon and evening sessions of the first day.

On the morning of the second day there will be a paper from Mr. H. G. Knapp, of New York, subject, "Originality of Design," and a paper from Mr. A. C. Nash, of Cincinnati, and a report from the Special Committee on "The Duties and Obligations of an Architect toward his Client."

Directly after lunch (which will be furnished at the Gibson House by the Cincinnati Chapter) visitors will take carriages and will visit the suburbs of the city, stopping at some of the finest dwellings. All visitors are requested to be on hand on the first day, and to report at once to the Committee of Arrangements at the Gibson House. Reports coming in from all over the country justify the expectation of a large attendance. From Chicago alone fifteen to twenty and perhaps more are expected.

THE TEXAS STATE CAPITOL.

Atlanta, Ga., October 5, 1882.

To the Editors of the American Architect:—

Messrs. Editors,—Please give in your valuable paper the name of the architect of the Capitol Building of Texas, spoken of in your editorial of September 30, 1882, and oblige

Yours respectfully, A. C. Bruce, Architect.

Detroit, Mich., October 2, 1882.

To the Editors of the American Architect:—

Sir,—From your reference to the "Capitol" of the State of Texas, in No. 353, September 30, one might infer that the building referred to was the permanent building which is to be constructed from the plans of E. E. Myers, architect, of Detroit, Michigan. The excavation for the foundation of this building is not completed, and the foundations have yet to be laid.

The building referred to in the New Orleans *Picayune*, from which you quote, was being built for use as a temporary Capitol from plans furnished by R. E. Ruffini, architect, Austin, Texas, and the immediate cause of the building giving way was the failure of the contractor to put a column in the masonry which the specifications called for, and his neglecting to execute work as required by them.

The enclosed article from the Galveston *News* of September 28 will help you to correct the false impression you received from the article in the *Picayune*, and relieve the architect of the permanent State Capitol from any responsibility for the failure of the temporary building.

I regret that you have not had the privilege, as I have, of seeing the plans for the permanent building. The last thing one would think of in examining them would be of the possibility of the walls being too weak, or the building ever being damaged by anything less than such an earthquake as is described in the "Tale of the Wonderful One-Hoss Shay," . . . "when Lisbon town saw the earth open and gulp her down."

In the competition, plans were submitted by many architects. The commissioners employed Napoleon Le Brun, architect, of New York, as an expert, and acting upon his recommendation, adopted the plan of E. E. Myers, of Detroit, architect of the State Capitol of Michigan.

The State of Texas paid as a premium seventeen hundred dollars, and in addition a liberal sum for the plans, details and specifications which have been furnished by the architect, and are as complete and perfect as could possibly be required or desired for such a building.

From the enclosed copy of specification and a sketch of the exterior, you can readily gain a correct idea of the proposed work. Excepting the Capitol at Washington, the building will be one of the largest, if not the largest public building in the country.

Respectfully yours, S. E. Loring.

Atlanta, Ga., October 4, 1882.

To the Editors of the American Architect:—

Dear Sirs,—In your last issue "Professor (?) Moser of Atlanta" is mentioned as the expert adviser in connection with the Texas State-House competition a year or so ago. I had nothing whatever to do with that transaction, either as adviser or competitor. If I remember aright, Mr. Le Brun was the expert adviser on that occasion. Very respectfully, John Moser.

NOTES AND CLIPPINGS.

New Use for Luminous Paint.—Supt. Kimball of the life-saving service is experimenting with luminous paint upon the tally boards used on the sea coast, which contain instructions to wrecked vessels how to co-operate with life-saving crews on shore. The tally boards are attached to a rope, which is fired across the wrecked vessel's rigging from a mortar. If the experiments are successful all of the boards will be lettered with luminous paint, which can be used as well at night as during the day.

Jefferson's Saw-mill.—The following story is told of President Jefferson, and it has a good point in it: Jefferson was a great man, but he was far from practical in some things. When he was in France he was very much struck with the utility of windmills. He thought they were wonderful institutions, and cost so little to run. He owned a large quantity of timber on a mountain much higher than Monticello, about a mile off. He purchased in France a windmill and the machinery for a saw-mill at the cost of $13,000, and had it taken to the top of the mountain. He had for a neighbor a bluff old fellow named Cole. One day Cole came to see him, and Jefferson took him up to where he was having the mill built. It was as much as they could do to climb the steep ascent. When Cole recovered the breath he had lost getting up the mountain, he said, "Mr. Jefferson, you have a splendid saw-mill, and it is in a splendid place to catch the wind, but how are you going to get the logs up here to saw from?" The author of the "Declaration of Independence" started like a man suddenly awakened from a delightful dream, and quickly said, "Hey, Cole, how? What?" And then, relapsing into abstraction, led the way down the mountain toward Monticello. The windmill was never completed, and years after the machinery was sold for old iron.—*Timber Trades Journal.*

Stable Hints.—The following admonitions, taken from *Whip and Spur*, may be useful to architects, both as lovers of horses and as the frequent designers of their homes: 1. Let your stable be well drained and sufficiently lighted. The vapors from a damp, putrid floor, and the sudden change from darkness to light, will almost to a certainty cause blindness. 2. Let the floor of the stalls be quite flat and level. Standing on a sloping place is very painful, and causes lameness by straining the ligaments and membranes. It also produces grease and sore heels. 3. Every stall should be at least six feet wide and nine feet long. This will enable the horse to turn round without bruising himself, and to lie down and stretch himself with comfort. 4. Let the stalls be separated by partitions, not by bars. They prevent the horses from fighting and kicking each other. 5 Let proper openings be made just under the ceiling to permit the hot, foul air to escape, and proper openings at the bottom of the wall to admit fresh air. Impure and confined air will cause broken wind. 6. The fresh air should enter through a number of small holes, rather than a large hole, such as an open window. That prevents draughts, which cause chills and coughs. 7. The temperature of a stable should be that of a sitting-room or parlor; not over seventy degrees in summer nor under forty-five degrees in winter. Hot, close or foul stables will bring on glanders or inflammation, while a very cold or damp one may cause an incurable cough, or disease of the lung. 8. Do not keep the hay over the manger. The steam and breath of the animal make it both unpleasant and unwholesome. If the hay must be kept over the horse, the ceiling between should be of plaster. This will in some measure prevent vapors from passing up to the food. 9. Have no opening into the manger from the hay-loft. Dust is very often thrown into the horse's eyes when fed in this way, and thus blindness is begun. The breath ascends directly to the food through the opening, which at the same time pours a continual draught down on the horse's head, thus causing chills, as well as bad food.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

265,581. STONE-LATHE. — Ethan R. Cheney, Chelsea, Mass.

265,601. APPARATUS FOR STEAM-HEATING. — William E. Haxtun, Kewanee, Ill.

265,629. WATER-ELEVATOR. — John Patten, San Francisco, Cal.

265,630. APPARATUS FOR RAISING WATER THROUGH SIPHON-PIPES. — John Patten, San Francisco, Cal.

265,633. AUTOMATIC REGULATOR FOR FURNACES. — Wm. E. Puffer, Brooklyn, N. Y.

265,636. VENTILATOR. — Rufus S. Read, Philadelphia, Pa.

265,647. PROSCENIUM-OPENING FOR THEATRES. — De Witt C. Waugh, Cincinnati, O.

265,653. STATIONARY WASH-BOWLS. — William Blackwood, Jr., Detroit, Mich.

265,675-676. FIRE-EXTINGUISHER. — Isidor Kitsee, Cincinnati, O.

265,678. FIRE-ESCAPE. — Gustav Kosmak, New York, N. Y.

265,697. STEAM-HEATING APPARATUS. — Eugene F. Osborne, St. Paul, Minn.

265,709. WATER-CLOSET TANK OR CISTERN. — Samuel F. Sniffen, New York, N. Y.

265,712. SCREW-DRIVER. — James Swan, Seymour, Conn.

265,716. DRAIN-TILE. — James Taylor, New Lexington, O.

265,744. PANTOGRAPH. — John G. Braastad, St. Paul, Minn.

265,772. SHUTTER-WORKER. — Russell G. Dudley, Jersey City, N. J.

265,802. COMBINED HEATER AND VENTILATOR. — Mathias Heckel. St. Louis, Mo.

265,814. VENTILATOR OR CHIMNEY-CAP. — John H. Irwin, Morton, Pa.

265,827. AUTOMATIC FIRE-EXTINGUISHER. — John and William Kane, Philadelphia, Pa.

265,834. FIREPLACE FRAME. — John J. Lebeau and Charles L. Shannon, Cincinnati, O.

265,877. FIRE ESCAPE. — Charles E. Seabury, Stony Brook, N. Y.

265,881. FIRE-ESCAPE. — George W. Smith, Harlansburg, Pa.

265,886. SASH-CORD GUIDE. — Alexander B. Tadlock, Knoxville, Tenn.

265,919-921. PNEUMATIC DOOR CHECK AND CLOSER. — Gilbert R. Elliott, Boston, Mass.

265,924-925. CATCH FOR LATCH-BOLTS. — Martin M. Henry, Ladoga, Ind.

SUMMARY OF THE WEEK.

Baltimore.

CHURCH. — All Saints' Episcopal, s e cor. Monroe and Baltimore Sts., stone, style Gothic, seating capacity, 400; cost, $16,000; C. E. Cassell, architect.

BUILDING PERMITS. — Since our last report twenty-six permits have been granted, the more important of which are the following: —

David F. Seltzer, three-st'y brick building, Chester St., between Baltimore and Hampstead Sts.

Thomas Findley, two-st'y brick stable, in rear of s w cor. Townsend St. and Vincent Alley.

J. M. Getz, two-st'y brick stable, in rear of 133 Valley St., between John and Biddle Sts.

Wm. or Sarah Devier, 2 three-st'y brick buildings, n e cor. Fayette and Bond Sts., and 4 three-st'y brick buildings, e s Bond St., in rear of above.

S. R. Robinson, three-st'y brick building, w s Gilmor St., n of Edmondson Ave.

John Holland, two-st'y brick stable, in rear of 182 and 184 East St., between Hillen and Front Sts.

E. J. McMullen, 3 three-st'y brick buildings, s w cor. Sewell St. and Argyle Ave.

E. J. McMullen, 2 three-st'y brick buildings, s e cor. Sewell St. and Argyle Ave.

Boston Fear, 5 three-st'y brick buildings, Lorman St., between Fulton Ave. and Bruce Alley.

Boston Fear and Alex Horner, 8 three-st'y brick buildings, w s Mount St., s of Presstman St.

Albert J. Renft, three-st'y brick building, 16' x 25', Lemon St., between Scott and Bartlett Sts.

Wm. C. Hoover, two-st'y brick building, s w cor. Monument and Cannon Sts.

L. Turnbull, 5 two-st'y brick buildings, Rutter Alley, between Townsend and Lanvale Sts.

Chas. Reinmertz, two-st'y brick building, Hamburg St., between Lexdenhall and Bevan Sts.

Brooklyn.

BUILDING PERMITS. — *Pulaski St.*, n s, about 250' e Lewis Ave., one-st'y brick engine-house; cost, $3,000; owner, H. Scharmann, Pulaski St.; architect, Chas. Stoll.

Cumberland St., No. 385, e s, three-st'y brick apartment house; cost, $13,500; owner, Mrs. Sarah King, on premises; architect, M. Thomas; builders, Wright & Brock.

Bushwick Ave., No. 279, s s, 50' w Boerum St., three-st'y frame tenement; cost, $4,900; owner, Louise Croneuweth, 198 Boerum St.; architect, F. Sauter; builders, Wm. Bayer & M. Metzen.

Vernon Ave., n s, 200' w Thompkins Ave., 5 two-st'y brick dwells.; cost, each, $4,200; owner and builder, J. Cregier, 709 Greene Ave.

Greene Ave., n s, 125' w Marcy Ave., two-and-one-half-st'y brownstone dwell.; cost, $3,200; owner, Mrs. M. Boone, Willoughby Ave., near Broadway; builder, Geo. F. Chapman.

Henry St., n w cor. Luquer St., 3 two-st'y brick dwells.; total cost, $7,000; owner, Robert Topping, 369 Franklin Ave.; builders, Cardwell & Hawkins.

Lexington Ave., n s, 70' e Nostrand Ave., 2 four-st'y brownstone tenements; cost, each, $15,000; owner, W. J. Northridge, 56 Myrtle Ave.; architect and carpenter, R. Van Brunt; mason, P. Burns.

North Eighth St., n e cor. Sixth St., one-st'y brick factory; cost, $6,000; owners, Holliday & Sons, on premises; architect, E. F. Gaylor; mason, James Rodwell.

South Third St., s w cor. Eleventh St., two-st'y brick church; cost, $10,000; owners, Trustees Zion African M. E. Church; architect, Ernest Dennis; builders, James Rodwell and C. L. Johnson.

South Third St., s w cor. Eleventh St., three-st'y brick church parsonage; cost, about $3,000; owner, etc., same as last.

Thompkins Ave., No. 491, e s, 22' n Decatur St., three-st'y brownstone store and dwell.; cost, $5,500; owner, J. D. Sullivan, 9 Decatur St.

Broadway, n s, 43' e Kosciusko St., three-st'y brick store and dwell.; cost, $5,200; owner, M. J. Hutchhausen, 469 Henry St.; architect, etc., G. H. Bohanna; mason, John Lambert.

Hart St., s s, 300' e Thompkins Ave., 3 two-and one-half-st'y brownstone dwells.; cost, each, $4,000; owner, etc., John K. Bulmer, 213 Adelphi St.

Pacific St., n s, 180' e Kingston Ave., two-st'y brick dwell.; cost, $5,000; owner, Frederick Hillerman, 629 De Kalb Ave., architect, J. W. Heustis; builders, Jas. Ashfield & Son, and Thos. Chaffers.

Hoyt St., w s, 65' n Carroll St., 2 three-st'y brick dwells.; cost, $5,000; owner and builder, Chester Bedell, 337 Smith St.; architect and carpenter, Theo. Pearson; mason, W. L. Rountree.

Fulton St., n w cor. Spencer Pl., 7 four-st'y brownstone tenements; cost, total, $65,000; owner, A. T. Lum, 118 East Eighty-ninth St., New York; architect, A. Hill.

Stuyvesant Ave., e s, 20' s Macon St., 4 two-st'y brownstone dwells.; cost, each, $2,500; owner, W. R. Wasson, 484 Macon St.; builders, C. Baur and Jno. Dhuy.

Eckford St., w s, 255' s Norman Ave., 2 three-st'y frame tenements, cost, $8,400; owner Philemon Walker, 132 Eckford St.; architect, F. Weber; builders, Pat. Newman and Thomas Kepple.

Utica Ave., extending from Pacific St. to Dean St., 13 three-st'y brick dwells.; cost, each, $3,000; owner, E. W. Perry, 198 Broadway, New York; architect, Amzi Hill; builders, W. S. Montgomery, and E. K. Hoffses.

Third Ave., n e cor. Tenth St., four st'y brick tenement; cost, $11,500; owner, W. Goehler, 971 Bergen St.; architects, etc., Gihrson & Liebbrand; masons, P. Kelly & Son.

Atlantic Ave., n s, 90' e Clinton St., four-st'y brick and brownstone flat; cost, $14,000; owner, J. J. Kiernan, First Pl.; architect, A. Pauli; builders, F. Kelley and M. H. Murphy.

Flatbush Ave., s w cor. Livingston St., five-st'y brick store and tenement; cost, $10,000; owner, J. E. Colyer, 42 Flatbush Ave.; architect, R. B. Eastman; builders, J. Thatcher & G. B. Colyer.

North Seventh St., s s, about 300' w Union Ave., one-st'y frame storage; cost, $7,000; owner, A. B. Ansbacher, 40 John St., New York; architect, Th. Engelhardt; builder, O. H. Doolittle.

Park Ave., w s, 200' e Thompkins Ave., 2 three-st'y brick tenements; cost, $5,000 each; owner and builder, Valentin Bruchhausen, cor. Agate and Maujer Sts.; architect, A. Herbert.

Bond St., w s, 180' n Wyckoff St., four-st'y brick tenement; cost, $8,800; owner and architect, G. F. Bolen, 162 Atlantic Ave.; builders, Hart & Boyd.

Seventeenth St., n s, 75' e Eighth Ave., 3 three-st'y brick tenements; cost, $5,000 each; owner, etc., Henry E. Wells, 619 Carlton Ave.

Floyd St., s s, 325' e Summer Ave., three-st'y frame tenement; cost, $4,000; owner, Caspar Goesmann, Ellery St., near Thompkins Ave.; builders, George Straub and John Rueger.

ALTERATIONS. — *Essex St., Nos.* 132 *and* 134, repair damage by fire, walls, etc.; cost, $3,000; owner, architect and builder, W. J. Gessner, 1722 Madison Ave.

Greene St., Nos. 42 *to* 50; cost, $6,000; owner, Daniel S. Appleton, 3 University Pl.; architect, William E. Worthen.

Boston.

BUILDING PERMITS. — *Brick.* — *Commonwealth Ave., Nos.* 334 *and* 336, for Vinal & Dodge, 2 two-st'y and mansard dwells., 24' x 54'; Vinal & Dodge, builders.

Commonwealth Ave., Nos. 320-326, Ward 11, for Geo. Wheatland, Jr., 3 two-st'y and mansard dwells., 24' x 54'; Vinal & Dodge, builders.

Newbury St., No. 253, Ward 11, for Prescott C. Hall, three-st'y mansard dwell., 24' x 54'; Silas W. Merrill & Son, builders.

Newbury St., Nos. 255-257, Ward 11, for Herbert Nash, trustee, 2 three-st'y and mansard dwells., 24' x 54'; S. W. Merrill & Son, builders.

Farnham St., near Gerard St., Ward 20, for O. H. Drisko & Co., two-st'y engine-house, 20' x 50'; O. H. Drisko & Co., builders.

Beacon St., No. 244, Ward 11, for T. Dennie Boardman, four-st'y dwell., 26' x 44'; ell, 20' x 33'.

Beacon St., No. 451, for Clarence A. Dow, three-st'y and Mansard dwell., 20' 6" x 51' 6"; Weston & Shepard, builders.

Wood. — Brooks St., near Falcon St., Ward 1, for Joseph W. Ordway, dwell. and store, 22' x 28'; Hamilton & Park, builders.

Edgewood St., near Southwood St., Ward 21, for Geo. H. Smith, two-st'y stable, 30' x 60'; A. D. Gould, builder.

Elm St., No. 51, Ward 3, for F. S. Atkins, two-st'y dwell., 20' 7" x 34'.

Longwood Ave., No. 120, rear of, for F. Krim, two-st'y stable and wagon-shed, 16' x 46'; Jacob Luippold, builder.

West Sixth St., No. 92, Ward 13, for Michael Giblin, three-st'y dwell., 22' x 40'; Patrick F. Hanlon, builder.

Medford St., nearly opposite North Mead St., Ward 4, for H. Wood, Son & Co., storage and manufacturing, 25' x 46'; Ira Hammond, builder.

Milton Ave., near Prospect St., Ward 20, for Alexander McKay, two-st'y dwell., 20' and 26' x 27' 2"; Alexander McKay, builder.

Vernon St., No. 125, Ward 19, for Geo. Leuth, dwell., 22' x 27'; James Jackson, builder.

Adams St., near Butler St., Ward 24, for James Pope, 2 two-st'y dwells., 20' 6" and 29' x 30'; ell, 16' x 24'; James Pope, builder.

Melville Ave., cor. Allston St., Ward 24, for Arthur H. Vinal, two-st'y dwell., 33' x 43' 6"; Arthur H. Vinal, builder.

Lester Pl., near Centre St., Ward 26, for Cyrus W. Cole, 2 two-st'y dwells., 18' 2" x 30'.

Evans St., near Dover St., Ward 24, for Walter M. Donnelly, two-st'y mansard dwell., 22' x 30'; Walter W. Donnelly, builder.

Gurney St., near Parker St., Ward 22, for Samuel Rantin, two-st'y carpenter-shop, 30' x 40'; Samuel Rantin, builder.

Chicago.

BUILDING PERMITS. — Clara B. Hansbrough, three-st'y and basement, brick dwell., 18' x 88', 3027 Michigan Ave.; cost, $9,000.

Wm. Westlake, 5 two-st'y and cellar brick dwells., 44' x 100', 3704 to 3712 Forest Ave.; cost, $20,000.

Scott & Gage, two-st'y and basement brick dwell., 21' x 44', 430 Wentworth St., cost, $4,000.

H. M. Hooker, three-st'y brick flats, 62' x 72', 732 to 736 West Jackson St.; cost, $25,000.

C. Brown, two-st'y brick dwell., 22' x 50', Warren Ave., near Kedzie St.; cost, $2,500.

Dr. E. J. Ogden, one-st'y addition to 1636 Michigan Ave., 23' x 40'; cost, $2,500.

Talbott & Halberg, two-st'y and basement brick dwells., 45' x 74', 198 to 202 Goethe St.; cost, $20,000. L. G. Halberg, architect; Lund & Gilbert, builders.

James Willard, two-st'y brick dwell., 21' x 46', 431 Kendall St.; cost, $3,500.

S. F. Wolff, four-st'y and basement stores and flats, 50' x 100', corner Goethe and Sedgwick Sts., cost, $25,000.

John Dieden, three-st'y and cellar flats, 50' x 61', 364 and 366 Wells St.; cost, $15,000.

V. Kontuck, two-st'y and basement brick store and dwell., 23' x 76', 614 West Eighteenth St.; cost, $4,800.

Wilson, Straight, three-st'y and basement brick dwell., 48' x 83', 1432 and 1434 Michigan Ave.; cost, $30,000. Cass Chapman, architect.

Chr. Rhoder, two-st'y brick dwell., 22' x 46', 246 Vine St.; cost, $2,500.

William Wilson, three-st'y brick dwell., 20' x 58', 3843 Johnson St.; cost, $3,500.

Herman Hayes, three-st'y brick dwell., 21' x 37', 335 Dayton St.; cost, $3,200.

J. M. Allen, one-st'y cottage, 20' x 34', Wood St. and Webster Ave.; cost, $3,200.

George Sunderland, two-st'y and basement brick dwell., 23' x 80', Forest Ave., near Thirty-seventh St.; cost, $6,000.

Hannah Busby, five-st'y and basement office-building and stores, 58' x 76', 51 and 55 Dearborn St.; cost, $60,000; Palmer & Spinning, architects; Chas. Busby, contractor.

J. H. Wood, two st'y and attic brick dwell., 26' x 65', 721 West Adams St.; cost, $9,000.

Thos. Jones and Wm. Grace, 6 three-st'y and basement brick dwells., 60' x 150', 98 to 108 Aberdeen St.; cost, $20,000.

F. S. Baird, 6 two-st'y and basement brick dwells., 40' x 120', 773 to 783 Walnut St.; cost, $15,000.

L. Wickersham, three-st'y and basement brick store and dwell., 24' x 100', 239 Larrabee St.; cost, $11,000.

W. Deyo, two-st'y and basement brick store and dwell., 25' x 66', 340 West Indiana St.; cost, $4,500.

M. D. McFadden, three-st'y and basement brick dwell., 42' x 50', 185 Rush St.; cost, $15,000; Cobb & Frost, architects.

M. Foote, 5 three-st'y and basement brick dwells., 33' x 100', 296 to 302 Illinois St.; cost, $20,000.

Mortimer, Tapper & Co., nine-st'y and basement brick office-building, 44' x 78', 187 and 191 La Salle St.; cost, $100,000; Burnham & Root, architects.

W. W. Evans, two-st'y and basement brick dwell., 18' x 65', 562 West Washington St.; cost, $5,000.

H. Hoepe, two-st'y and basement brick dwell., 22' x 56', 730 Wood St.; cost, $4,000.

Cincinnati.

BRICK. — During the past week there has been a rise of $1 per thousand in the price of brick in this market. The price now is $8.50 delivered.

APARTMENT-HOUSES. — Hubert Heuck is building a building on Vine St., near Thirteenth St., for stores and flats, 90' on Vine St., 45' deep, four-st'y, pressed brick front; cost, about $15,000; Geo. W. Rapp, architect.

BUILDING PERMITS. — W. H. Harrison, 7 three-st'y brick dwells. and stores, n e cor. McMillan St. and Gilbert Ave.; cost, $25,000; Samuel Hannaford, architect.

Max A. Fox, two-st'y brick dwell., Chase St., near Dalton Ave.; cost, $2,500.

Herman Lackman, 5 three-st'y brick dwells., Lower River Road, near Railroad; cost, $15,000.

Seven permits for repairs; cost, $6,500.

New York.

STORES. — A store, 75' x 120', is to be built on Fifteenth St., on the lot now being cleared, adjoining Tiffany's. It is to be built of brick, with Ohio stone finish. The Van Buren estate are the owners.

Bids are being received for the store to be built on Fifth Ave., between Fifty-ninth and Sixtieth Sts., for Messrs. Park & Tilford.

HOUSE. — For Mrs. Robert M. Reynolds, a house, 18' x 54', is to be built, of brick, with brownstone finish, on the south side of Ninety-third St., 175' w of Eighth Ave., from designs of Messrs. D. & J. Jardine.

BUILDING PERMITS. — *Second St., No* 217, five-st'y brick store and tenement; cost, $9,000; owner, Henry Brossler, 718 Fifth St.; architect, F. W. Klemt; builder, P. Schaaf.

Seventh Ave., w s, 29' 11" n One Hundred and

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Twenty-seventh St., 3 five-st'y brownstone tenements; cost, each, $20,000; owner and architect, same as last.

One Hundred and Twenty-sixth St., s s, 210' w Third Ave., five-st'y brick tenement; cost, $15,000; owner, Isaac E. Wright, 1983 Madison Ave.; architects, Thom & Wilson; built by days work.

One Hundred and Twenty-eighth St., s s, 225' e Seventh Ave., 3 four-st'y brownstone flats; cost, total, $90,000; owner and builder, John B. Davis, 236 East One Hundred and Twenty-sixth St.; architect, W. H. Hume.

One Hundred and Thirty-first St., s s, 250' e Twelfth Ave., 3 four-st'y brick tenements; cost, each, $11,000; owner, Charles Borncamp, 170 Robbins Ave.; architect, J. Barrett.

Fourth Ave., e s, 25' n One Hundred and Twenty-seventh St., 3 four-st'y brick flats; cost, each, $18,000; owner, Lawrence Weiher, New Rochelle; architect, Chas. Baxter.

Tenth Ave., w s, 75' s Two Hundred and Fourteenth St., two-st'y frame dwell.; cost, $3,500; owner, Bernard Fellman, 500 Broome St.; builder, G. W. Varian.

Melrose Ave., s e cor. One Hundred and Sixty-second St., two-st'y frame dwell.; cost, $3,000; owner, Mrs. Eliza Rogers, One Hundred Sixty-second St., bet. Courtland and Elton Aves.; architect, M. J. Garvin; builders, P. Garvin & Son.

Southern Boulevard, n w cor. Thompkins St., 2 two-st'y frame dwells.; cost, each, estimated, $3,750; owner and architect, James H. Whitelegge, Fordham, N. Y.; builders, Mr. Hargraves, and Joyce & Carpenter,

One Hundred and Thirty-fourth St., n s, 175' e Lincoln Ave., three-st'y brick factory; cost, $5,500; owner, I. E. Baker, 220 East One Hundred and Twenty-fourth St.; architect, Theo. E. Thomson.

Eighth St., Nos. 423 *and* 425, between Ave. D and East River, four-st'y brick factory, tin roof; cost, $10,000; owner, John Roach, foot Ninth St., East River; builders, R. Shapter and Guy Culgin.

West Thirty-first St., Nos. 244, 246 *and* 248, 3 five-st'y brownstone tenements, tin roof; cost, each, $17,000; owner, John Smith, 242 West Thirty-first St.; architect, Wm. Kuhles.

East Forty-fourth St., Nos. 6 *and* 8, 2 four-st'y brownstone dwells., tin roof; cost, $35,000 and $40,000; owner, Charles Buek, 63 East Forty-first St., architects and builders, C. Buek & Co.

Forty-seventh St., s s, 100' e Ninth Ave., 13 five-st'y brick and brownstone tenements, tin roof; cost, each, $18,000; owner, Frederick Schuck, 516 East Eighty-fifth St.; builder, J. Brandt.

West Fifty-fifth St., No. 454, five-st'y brownstone tenement, tin roof; cost, $17,000; owner, architect and builder, Wm. Rankin, 306 West Forty-seventh St.

Fifty-eighth St., s s, 250' e Second Ave., 3 five-st'y brick tenements, tin roof; cost, each, $18,000; owner, James Meagher, 282 East One Hundred and Twenty-sixth St.; architects, Babcock & McAvoy.

Tenth Ave., Nos. 522, 524 *and* 526, 3 five-st'y brick tenements, tin roof; cost, each, $8,500; owner, John Totten, 417 West Forty-sixth St.; architect, C. F. Ridder, Jr.

First Ave., s e cor. Seventy-fourth St., five-st'y brick factory, tin roof; cost, $30,000; owner, John W. Love, 6 Rivington St.; builders, Robert L. Darragh & Co.

Fourth Ave., No. 1250, four-st'y brownstone tenement, tin roof; cost, $13,000; owner, Mrs. Mary A. Foley, on premises; architect and builder, James Judge.

One Hundred and Twenty-fifth St., s s, 90' e Fourth Ave., four-st'y brick stores, hall and lodge rooms, tin roof; cost, $45,000; owner, J. M. Horton Ice Cream Co., 305 Fourth Ave.; architect, R. Rosenstock.

East Eighty-sixth St., No. 103, three-st'y brick dwell., tin roof; cost, $5,000; owner, Moritz Bauer, 207 East Fifty-fifth St.; architect, Paul F. Schoen.

Sixty-fifth St., s s, about 50' w Twelfth Ave., two-st'y brick office, slate and tin roof; cost, $20,000; owner, N. Y. C. & H. R. R. R. Co.; builder, Joseph Richardson.

Tenth Ave., s w cor. One Hundred and Twenty-fifth St., 5 four-st'y brick tenements, tin roof; cost, each, $14,000; owner, John F. Dunker, 170 Robbins Ave.; architect, James Barrett.

Seventh Ave., s w cor. One Hundred and Twenty-eighth St., 4 five-st'y brownstone flats, tin roof; cost, each, $11,500 and $14,000; owner, P. Whelan, One Hundred and Thirty-eighth St. and Southern Boulevard; architect, J. F. Burrows.

One Hundred and Twenty-eighth St., s s, 85' w Seventh Ave., 2 three-st'y brick dwells., tin roof; cost, $9,500; owner, P. Whelan, One Hundred and Thirty-eighth St. and Southern Boulevard; architect, J. F. Burrows.

One Hundred and Forty-third St., s s, 445' e Willis Ave., 2 two-st'y frame dwells., tin roof; cost, each, $3,000; owner, H. V. Morrison, Willis Ave., between One Hundred and Forty-second and One Hundred and Forty-third Sts.; architect, R. Rosenstock.

One Hundred and Fifty-ninth St., s s, 200' e Courtland Ave., two-st'y frame tenement, tin roof; cost, $2,500; owner, Rudolph Eisele, Courtland Ave., cor. One Hundred and Sixtieth St.; architect, J. C. Stichler; builder, John Freese.

Courtland Ave., e s, 25' n One Hundred and Fifty-seventh St., three-st'y frame dwell., tin roof; cost, $3,500; owner, Peter Helferich, 314 West Thirty-ninth St.

Philadelphia.

Building Permits. — *Palethorp St.*, s w cor. Norris St., 2 three-st'y dwells., 14' x 28'; Jno. Kuntz, contractor.

Westmoreland St., cor. Frankford Road, two-st'y store and drying-room, 30' x 50'; Jno. Cunningham, contractor.

Ninth St., n w cor. Dickinson St., 6 two-st'y dwells., 16' x 42'; Jas. McCall, contractor.

Front St., w s, e of Norris St., 2 three-st'y store and dwells., 16' x 60'; Geo. Kessler, contractor.

Warnock St., No. 1221, three-st'y dwell., 16' x 44'; C. Wilkie, contractor.

Reed St., Nos. 1826 *to* 1830, 8 three-st'y dwells., 16' x 44'; Jos. Stuckey, contractor.

Fifth St., n of Lehigh Ave., three-st'y dwell., 18' x 56'; Shegog & Quigley, contractors.

Paul St., No. 4741, two-st'y foundry, 50' x 59'; Jas. Comly, owner.

Susquehanna Ave., n s, w of Twenty-ninth St., 2 two-st'y dwells., 16' x 44'; Shultz & Gorman, contractors.

Ann St., n e s, w of Frankford Creek, 2 two-st'y dwells., 16' x 28'; D. D. Glenn, contractor.

Queen Lane, n s, e of Thirty-fifth St., two-st'y dwell., 17' x 48'; C. C. Linnahan, contractor.

Palmer St., No. 1313, two-st'y stable, 24' x 50'; W. H. Rookstool.

Thompson St., n e cor. Palmer St., two-st'y store and dwell., 17' x 48'; C. G. Harris, contractor.

Irvin St., n s, rear 3928 Locust St., two-st'y stable, 22' x 40'; J. H. Cofrode, owner.

North Fifth St., No. 22, five-st'y store, 31' x 90'; Henry R. Coulomb, contractor.

James Ave., s e s, between Ridge Ave. and Houghton St., two-st'y dwell., 20' x 50'; S. Yardley, contractor.

Eighth St., n e cor. Willow St., four-st'y factory, 60' x 125'; Jas. Keeley, contractor.

Richmond St., n e cor. Leopard St, three-st'y factory, 41' x 98'; Jno. S. Steel, contractor.

Adams St., No. 5521, three-st'y dwell., 18' x 45', and one-st'y stable, 16' x 22'; W. B. Dewees, owner.

Randolph St., w s, n of Thompson St., 6 three-st'y dwells., 16' x 39'; Geo. Snyder, contractor.

Wakefield St., No. 4630, two-st'y engine-house, 30' x 35'; Jno. C. Miller, owner.

Alterations and Additions. — *Sixty-fifth St.*, w s, near Pike and Haddington Sts., three-st'y addition to dwell. and back building, and two-st'y stable, 22' x 26' and 20' x 46'; Lewis Havens, contractor.

South Broad St., No. 256, second-st'y addition to hall, 22' x 44'; F. Thron, owner.

Green St., n e cor. Tulpehocken St., one-st'y addition to building, 48' x 68'; Geo. Hearst, contractor.

Powder Mill Lane, cor. Fr'k'd Creek, fifth st'y addition to factory, 43' x 110'; J. P. Betts.

Clarence St., No. 2604, second st'y addition to store and dwell., 18' x 28'; Jas. Hague, owner.

Second St., No. 727, two-st'y back building, 14' x 34'; Chas O'Kronglowicz, contractor.

Wallace St., No. 923, three-st'y front building, 16' x 28'; H. W. Vankirk, contractor.

St. Louis.

Building Permits. — Twenty-five permits have been issued since our last report, of which eleven are for unimportant frame houses; of the rest those worth $2,500 and over are as follows: —

Peter Rember, two-st'y brick store and dwell.; cost, $4,000; F. Mueller, contractor.

J. G. Moser, two-st'y brick dwell.; cost, $8,000; E. Jungenfeld, architect; Charles Wehking, contractor.

H. Schulte, two-st'y brick dwell.; cost, $2,500; C. F. May, architect.

J. Johnson, three-st'y brick dwell.; cost, $5,500; J. A. Conlon, architect and contractor.

J. Johnson, three-st'y brick dwell.; cost, $5,000; T. Manning, contractor.

Dixon & Young, one-st'y brick storehouse; cost, $4,200; C. Aufderheide, contractor.

Mrs. Kate Bergman, two-st'y brick dwell.; cost, $2,800; H. R. Becker, contractor.

Emile Karst, two-st'y brick dwell.; cost, $4,500; Strimple, contractor.

Washington.

Building Permits. — The following are the permits issued since last report: —

Joseph Anthony, 2 two-st'y brick dwells., 12' x 28'; alley bet. L and M Sts., and Fourth and Fifth Sts., n w; cost, $1,000.

Thomas Broderick, two-st'y and basement brick dwell., 20' x 32'; R St., bet. Twenty-first and Twenty-second Sts., n w; cost, $2,800.

John T. Cole, two-st'y and basement brick dwell., 20' x 34', M St., near Fifth St., n w, cost, $3,000.

H. C. Espey, two-st'y brick dwell., 21' x 29', Third St., and I and K Sts., n w; cost, $2,000.

M. G. Emery, three-st'y and basement brick dwell., 24' x 71', M St., bet. Fourteenth and Fifteenth Sts., n w; cost, $10,000.

Adolph Eccard, two-st'y and basement brick dwell., 22' x 33' N. H. Ave., bet. M and N Sts., n w; cost, $4,500.

John Grinder, 2 two-st'y brick dwells., 14' x 30', D St., bet. First and Second Sts.; n e; cost; $2,000.

D. B. Groff, 6 two-st'y brick dwells., 15' x 32', cor. Seventh and A Sts., n e; cost, $12,000.

Hugh McCaffrey, 2 three-st'y and cellar brick dwells., 19' 6" x 28', Corcoran St., bet. Fourteenth and Fifteenth Sts., n w; cost, $5,000.

Thos. McLaughlin, two-st'y brick dwell. and cellar. 24' x 36', N St., near Thirteenth St., n w; cost, $4,000.

Ed. Temple, three-st'y and basement brick dwell., 22' x 24', cor. K and Ninth Sts., s w; cost, $5,500.

Mrs. M. S. Wynne; 3 three-st'y brick dwells. and basement, 16' x 36', cor. O and Fifteen Sts., n w; cost, $7,500.

The annual report ending June, 30, 1882, shows that 1,730 permits have been issued at an estimate value of $2,468,986, which includes 560 new brick buildings at an estimated value of $1,828,443, but does not include house built by the United States or the District governments.

General Notes.

Bath, Me. — The preparation of the foundation for the buildings of the Bath Ship-Building Company is progressing.

Duluth, Minn. — T. H. Pressnall, dwelling house cost, $3,500; D. S. Hopkins, architect, Grand Rapids, Mich.

Edgewood, Ga. — Frame residence for Geo. Colquith, also one for Mr. McBride.

Fayette, Mass. — A new four-st'y factory, 168' x 191', is to be built by Messrs. Mawhinney & Co., proprietors of the old shoe factory with which it is connected.

Pittsburgh, Pa. — The plans for a new four-st'y building, 60' x 90', for the Y. M. C. Association, at the cor. of Penn Ave. and Seventh St., have been adopted. James Loughlin, Jr., and Mr. Thomas J. Gillespie were chosen members of the building committee. About $70,000 has been raised, but $5,000 more is needed.

Saccarappa, Me. — The corner-stone of the new Odd Fellows' Hall at Saccarappa was laid last week.

South Framingham, Mass. — A new brick block, which will contain a hall for public uses, will be built at once.

Waterloo, Ia. — Residence for G. H. Whitney, wood frame with brick veneer; cost, $12,000; Snider & McKay, builders; Josselyn & Taylor, of Des Moines, architects.

Waterville, Me. — At a meeting of the trustees of Colby University it was decided to erect a new building for the Waterville Classical Institute; the cost to be from $35,000 to $40,000.

West Union, Ia. — Two-st'y school-house is building of brick, from plans by Josselyn & Taylor, of Des Moines; cost, $12,500; Ogsbury & Winrott, contractors.

Yonkers, N. Y. — A stone and wood house is to be built for Mr. F. N. Bangs; from designs of Mr. H. N. Marshall, of N. Y.

A residence is to be built on Broadway, for Mr. Geo. Preene; from designs of Messrs. Silliman & Farnsworth, of N. Y.

PROPOSALS.

SEWERS, WATER-PIPES, ETC.

[At Lake View, Ill.]

The Town of Lake View invites proposals for furnishing of the materials and the construction of sixteen hundred (1,600) feet of one-foot pipe sewer; three thousand (3,000) feet of two (2) feet brick sewer; three thousand nine hundred and twenty (3,920) feet of three (3) feet brick sewer; one thousand three hundred and twenty (1320) feet of four (4) feet brick sewer; and one thousand seven hundred (1,700) feet of five (5) feet brick sewer, in accordance with plans and specifications on file in the office of the Town Engineer, Room 6, 69 Dearborn St.

And also proposals to furnish materials and lay water-pipes in the town of Lake View, in accordance with the ordinance of said town, which requires said pipes to be laid five and one-half (5½) feet deep and sheet piling to be at the expense of the contractor, and the pipes to be insured for six months by the contractor.

The Town Board will open bids at a meeting to be held **at 2 o'clock, P. M., October 25,** at the town-hall, in said town.

The work will be paid for out of the proceeds of special assessments for that purpose.

The Town Board reserves the right to reject any or all bids.

Sealed bids are to be left with the Supervisor, Town Clerk, or presented at the open board meeting, each bid to be accompanied with a certified check of three hundred dollars, payable to the order of George W. Parkes, Treasurer, to be returned if bids are not accepted, and to the accepted bidder when the contract is signed and bond accepted.

GEORGE W. PARKES, Supervisor.

Room 12, 155 La Salle St. 356

LOCKS AND LOCK-GATES.

[At Chicago, Ill.]

Office of the Department of Public Works, Chicago, October 16, 1882.

Sealed proposals will be received by the Department of Public Works at their office **until 11 A. M., Thursday, October 26, 1882,** for the construction of a lock, with the necessary cribs, docking, gates and appurtenances, to be placed in the channel of the Illinois & Michigan Canal, near Ashland Ave., in the city of Chicago, according to plans and specifications on file in said office.

Proposals must be addressed to the Department of Public Works, indorsed "Proposals for Canal Lock," and be accompanied with $500 in money, or a certified check for the same amount on some responsible bank doing business in the city of Chicago, and made payable to the Commissioner of Public Works.

The Commissioner of Public Works reserves the right to reject any or all bids. No proposal will be accepted unless the party offering it shall give evidence satisfactory to the Commissioner of Public Works of his ability and integrity, and that he has sufficient pecuniary resources to fulfil the contract promptly, in accordance with the specifications thereof, if awarded to him. Companies or firms bidding will give the individual names as well as the name of the firm.

DEWITT C. CREGIER, Commissioner of Public Works.

SEA WALL.

[New York Harbor.]

U. S. Engineer Office, Room 59 Army Building, Corner Houston and Greene Sts., New York City, October 10, 1882.

Sealed proposals, in duplicate, will be received at this office **till 12 M., Wednesday, November 22, 1882,** for furnishing materials and labor for the construction of a granite sea wall on Governor's Island, New York Harbor. Appropriation, $39,000.

For information, blank forms, etc., apply at this office.

G. L. GILLESPIE, Major of Engineers.

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BREAKWATER.

[At Buffalo, N. Y.]

United States Engineer Office, Oswego, N. Y., October 2, 1882.

Sealed proposals for the extension of the Buffalo breakwater will be received at the U. S. Engineer Office, Oswego, N. Y., **until 11 o'clock,** A. M., **on Wednesday, November 8, 1882.**

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders may be had on application to this office.

WALTER McFARLAND, Major of Engineers

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 357.

OCTOBER 28, 1882.

Entered at the Post-Office at Boston as second-class matter.

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WE regret sincerely to learn of the death, in New York, of Mr. Henry Robinson Searle, an architect well known there and in other parts of the country. Mr. Searle was born in Burlington, Vermont, in 1836, but spent his early years and began his professional life, in Rochester, New York. In 1865 he removed to Washington, where he designed the building of the Howard University, the Congregational Church, and the *Republican* newspaper office, besides other structures. In 1879 he was sought out by a wealthy gentleman who had seen and been pleased with some of his work in Rochester, and induced to leave Washington and take up his residence in New York, where he found constant employment until his health gave way before the distressing malady which at last proved fatal to him.

THE telegraph informs us, just as we go to press, of the election at Cincinnati of Professor William R. Ware, of New York, as Secretary of the American Institute of Architects, succeeding Mr. A. J. Bloor. Mr. Bloor, who, during his long and faithful service as Secretary, has done, perhaps, more than any other member of the Institute to maintain its dignity and usefulness, some years ago found the burden of his duties too great for his strength, and for a time the work was undertaken by others, but in 1880, when, on the resignation of Mr. Congdon, the Institute was in danger of being left without a Secretary, he generously consented to resume the labors of the office from which he now retires with the well-merited gratitude and esteem of the profession. Concerning the qualifications of his successor it is needless to speak, since every one knows of his distinction as an architect and writer on technical subjects, as well as of his success in creating the school of architecture in Boston, from which he has only lately been transferred to wider usefulness in New York. Whatever a thorough understanding of professional interests, and self-sacrificing devotion to them, can do to fit a Secretary of the Institute for his responsible position, is already done for Professor Ware, and the influence which he has long so wisely exerted to benefit the younger generation of architects, will now find a still larger field for its activity.

A VERY important decision has been rendered by the New York Court of Appeals, the highest court in the State, in the case of Story, an owner of real estate on Front Street, in New York City, against the New York Elevated Railroad Company, which, as the plaintiff alleges, deprives him of the rights and privileges in the street, to which, as an abutting owner, he is entitled, by maintaining a railroad over the middle of it. The two lower courts decided for the railroad company, but the Court of Appeals has reversed the decision, and gives judgment, by the votes of four out of the seven justices, in favor of the plaintiff. Front Street was reclaimed from the sea, and was once, with the tract adjoining, the property of the city, which conveyed lots on each side of it, describing it as a public street. This, in the opinion of the judges, gave the purchasers of the lots a right to the use of the whole street, with all the light and air which it is a part of the object of streets to supply, and the plaintiff, taking his title from the original grantees of the city, is justified in claiming that the street shall be kept open and continued as a public street for the benefit of his and other abutting estates. That such a privilege as this, belonging to his property and acquired in connection with it, shall not be taken away or abridged without compensation, is expressly provided in the Constitution of the State, and as the elevated railway track unquestionably interferes with the light and air as well as the freedom of passage afforded by the street, and will continue to do so as long as it stands there, the plaintiff is entitled to an injunction to prevent it from being maintained there. In view, however, of the injury which would be inflicted upon the railway company by a summary stoppage of its traffic, the Court withholds the injunction to give time for an amicable arrangement for compensation to be made between the parties.

THE Mutual Union Telegraph Company proposes to introduce certain novelties in the conduct of its business. In Switzerland an arrangement has long been in use by which any person can hire a telegraph wire, with the operators at each end, for a fifteen-minute conversation with some other person previously notified to be present in the office at the other extremity of the line. The Mutual Union Company improves on this system by undertaking to make appointments for two persons who wish to communicate with each other to meet in the offices nearest to their respective places of business, and furnishes them at the given time with the services of the two operators and a wire for as many minutes as may be agreed upon. This new plan, which extends the convenience of the telephone to the long distances of the telegraph, is likely, we should suppose, to prove very popular among business men.

THE first civil suit for damages against the proprietor of the Randolph Mills, in Philadelphia, which were burned a year or so ago with considerable loss of life, has been decided in favor of the plaintiff, who was awarded the substantial sum of forty-five hundred dollars. Unless the decision should be reversed by a higher court the suit will be followed by several similar ones, and the owner of the mill will have to pay dearly for the indifference to the welfare of those dependent upon him which brought so many of them to a cruel death. We imagine that most persons will view with equanimity the transfer of money from the pocket of the person who profited by the labor of the innocent victims of the fire to that of those who have been needlessly deprived of the comfort and support which that labor earned for them; and the fashion of claiming pecuniary indemnity from selfish and careless employers for the consequences of their neglect would, if it were to spread, do much more to reform the condition of small manufactories than the untenable indictments for manslaughter, or the ill-executed building laws, which are now thought sufficient for the purpose.

THE New York *Times*, in an editorial upon "Competitive Designs for Statues," laments the rapid increase of "bad, stupid and indifferent monuments," in this, as well as other countries, and attributes the evil in part to the competitions which are held for designs. In its opinion the bare announcement that competitive designs will be received from sculptors eliminates at once the men of character and reputation, who are unwilling to submit the question of the merit of their work to the decision of unskilled amateurs, such as usually compose the committee, even if the prizes offered were adequate to the time and labor involved, which is very rarely the case, and the competition usually turns out a total failure, or the prize is carried off by some manufacturer of monuments, rather than an artist. The remedy which the *Times* proposes for this state of things is, we think, a very doubtful one. "If committees on monuments cannot decide unanimously on one sculptor," it says, "the only way to do is to visit several sculptors in succession, talk the monument over, and engage each to deliver a design at a fixed price. The deliberation should then be kept secret, and should it turn out that portions of several designs are taken to form the monument, the authors of those designs should be approached, and their rightful claims satisfied by an amicable arrangement." Although the intention of all this is fair enough, we imagine that committees would find good sculptors quite as averse to entering into competition on these terms as they are under the present circumstances. The idea that his design will be judged by unskilled amateurs is

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sufficiently discouraging to an artist, but a further prospect that "portions" of it "by an amicable arrangement," may be taken to combine with portions of some one else's design is worse still; and the number of sculptors who care so little for their reputation as to accede to any such proposition must be small indeed. If artistic competitions are to continue, as is in some respects desirable, and in any case probable, the way to induce men of ability to enter them is to make them fair and unquestionable tests of that ability. There is no one, ambitious to excel in his profession, who is not pleased with an opportunity to gain distinction, even at a considerable sacrifice of labor or money, but the distinction to be gained must be real, and while the history of art sufficiently shows the willingness of the ablest men of their time to try their skill in contests where lasting fame is the certain reward of the victor, a competition which is to be decided by laymen, or even by experts of obscure reputation, or worse still, by the local prejudice, or political influence, or personal favor, which are, rightly or wrongly, charged with determining the result in too many instances, is looked upon by any artist worthy of the name as a transaction more or less degrading and disgraceful, according to the intention of the parties, to all concerned in it; and a sculptor whom necessity or trust in undue influence leads to take part in such is despised accordingly.

A correspondent asks us whether any means can be invented "to teach committees who have public buildings in charge that a gratuitous competition without expert judges will not bring them a single design worthy of execution." To this we can reply at once that there is a very effectual means for accomplishing the desired end, and that is, the refusal of reputable architects to enter such competitions. As soon as it is understood here, as it is in other civilized countries, that no architect will respond to any invitation to compete except on the terms recognized by the profession — that the award shall be publicly made by experts of reputation, and that the execution of the building or other structure, at the usual commission, shall be confided to the winner of the competition, — then, and not till then, shall we see the last of the ridiculous, unfair and disgraceful scrambles which are maintained by the folly, and at the expense, of those architects, particularly the younger ones, who imagine that they are to obtain some private advantage by degrading themselves and betraying the interests of the profession, for the benefit of persons who, to say the least, will not be rendered more scrupulous in treating them by witnessing their own disloyalty to their fellows. There is in this country plenty of work for all the architects in it to do, at a fair remuneration. No one else can do it, so that they are sure of the employment, and if they choose to do it for less than it is worth, they have only themselves to thank. A beginning has already been made in St. Louis, by an agreement of a large number of architects to have nothing to do with competitions where certain proper conditions — the appointment of expert judges among them — are not complied with. If a similar understanding could be arrived at between the architects of other places, we should soon see a great change in the conduct of competitions, which, instead of artifices for deluding, cheapening and degrading the profession, would become the recognized and honorable means for introducing the younger architects to lucrative practice, while the established and busy ones, in return for the loyalty of their juniors, would gladly lend their influence in sustaining these against the attempts of astute selfishness to take advantage of their youthful hopefulness and lack of caution.

A new suggestion for the prevention of disastrous floods in the Mississippi River has been made by Mr. Lyman Bridges, a civil engineer of reputation, who points out that in times of overflow a considerable volume of water finds its way to the Gulf of Mexico by way of the Atchafalaya River, which is simply another name for a network of lakes and bayous extending from the mouth of the Red River to Atchafalaya Bay, and connecting with the Mississippi by three or four different channels. Mr. Bridges thinks that the depression of the Atchafalaya has long formed an outlet for a portion of the Mississippi water, and says that, owing probably to the greater violence of the freshets following the destruction of the forests in the river valley, the width of that stream has been increased since 1850, by natural causes alone, from seven hundred and thirty feet to twelve hundred feet, and its maximum depth from fifty-two to more than one hundred feet; and this in spite of all the efforts which have been made, at a cost of more than a hundred millions of dollars, to confine the water of the Mississippi within its present channel. Quite recently a steamboat was navigated by the Atchafalaya route from Chicago to the Gulf of Mexico, and as the distance from the mouth of the Red River to the Gulf by this course is only half as great as by way of New Orleans, the improvement and deepening of the stream would be a great service to the inland commerce of the country, while space would be provided for one-third of the flood-waters of the Mississippi, which now tax the levee system to the extreme limit of its strength.

An interesting plan has been formed in Paris by an intelligent and enthusiastic manufacturer of furniture for the establishment of an atelier devoted exclusively to the production of articles of furniture to be supplied to other manufacturers as models for use in their business. Every expert has observed the uncertain taste which seems to prevail even among dealers of the highest reputation, who exhibit for sale articles of beautiful form side by side with the most clumsy and vulgar objects. The explanation of this is probably to be found in the character of the designers employed, one of whom may be a person of cultivated taste and skill, among a number of others remarkable chiefly for their stolid indifference to any of the graces of proportion or modelling; but ugly design is cheap, and so long as such furniture can be sold it will be made. The Paris plan, however, seeks to economize the cost of designing, — a large item in the expenses of a fashionable manufacturer, — at the same time improving its quality, by the formation of a school of young artists, under competent direction, who will study their specialty with intelligent interest, and be led by emulation to strive after the highest excellence. Their productions, costly in themselves by reason of the care with which the design of every detail is studied, can be reproduced by the hundred at a much lower price, and although work so multiplied would soon lose its novelty, it will not lose its beauty, and it is only foolish persons who cease to find pleasure in pretty things after they find that their neighbors have the same. The extraordinary popularity of late years of certain familiar patterns of minor metal-work, such as sconces and dragon candle-sticks, is a proof of the general appreciation, in the long run, of designs of real merit. Hundreds of novel suggestions for the same things have had their day and passed by, but the beautiful old patterns are as much favored as ever. The case would undoubtedly be the same with furniture, and sets of intrinsic beauty or grace would command a constant sale long after their design had become familiar to every purchaser.

The explosion in a manufactory of fireworks at Chester, Pennsylvania, about a year ago, seems to have resulted in the discovery of a new detonating compound which may prove valuable in the arts. After the Chester catastrophe, in which it was suspected that a quantity of blue-fire composition played a considerable part, another explosion of blue-fire took place in New Zealand, where a chemist's assistant was burning some condemned composition, and threw water upon it to extinguish it; and Professor Jackson, following this clue, succeeded in reproducing the same result, and in determining at will the detonation of a substance hitherto regarded as incapable of decomposition in that way. In an experiment tried at Woodbury, N. J., a tube containing two pounds of blue-fire was placed in the ground, and a large stone laid upon it. The charge was then fired by means of a percussion cap ignited by an electric spark, after the mode employed with dynamite cartridges, but the explosion produced is said to have been even more violent than that of dynamite. The stone laid on top of the charge was shattered, a large hole was dug in the ground, and a cloud of dirt and dust was thrown a hundred feet in the air. An equal quantity of gunpowder fired under the same conditions produced no particular result, but when a second cartridge of blue-fire was placed in position, with a little powder on top, and the powder fired in the usual way, the concussion caused by the explosion of this caused the detonation of the blue-fire, with the same violence as in the first instance. When the blue-fire composition was lighted with a match it merely burned away. The material is composed of chlorate of potash, ammonio-sulphate of copper, and either shellac or sulphur, and is much more stable and safe to handle than the compounds of nitro-glycerine, while its explosion is produced with the same certainty, either by a percussion primer or one of gunpowder, and whether the composition is wet or dry.

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GIRDERS. — IV.

III. — TO DETERMINE SECTION OF GIRDER.

Termi-nal from a Bench Private Chapel Lambeth Palace Eng.

WE now have given or have obtained the following conditions:

1. The bending moment M and the shearing strain, acting at any point of the girder and caused by the loading.

2. The stiffness or value of I required at any point of girder.

3. The additional area which must be added to the section at that point for the purpose of safely resisting the shear.

4. The material of which the girder is to be composed.

The problem of designing the required section is then divisible into three parts:

a. A consideration of the different forms of section in use, with the different modes of connecting the parts of a compound girder, and of attaching the floor joists to the girder.

b. The general methods for determining the dimensions of the section required to have a given moment of inertia, or *vice versa*.

c. Applications of these methods to practical examples.

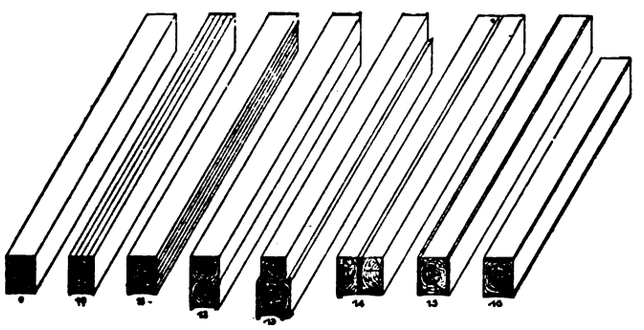
A. — CLASSIFICATION OF GIRDERS.

I. — *Principally composed of wood.*

1. Single; merely a timber of rectangular section. Fig. 9.

2. Composed of several timbers set vertically beside each other and firmly fastened together. Fig. 10.

With proper fastenings this form is just as strong as the last, and is frequently preferable, especially for long continuous or horizontally curved girders.



3. Composed of several timbers laid one on the other. Fig. 11.

If the timbers are not fastened together the strength of such a girder will be little more than the sum of the strengths of the timbers taken separately, since if the girder were loaded the timbers would bend and slip on each other, appearing as shown in Figure 45; but if firmly fastened, so as to prevent all slipping, the girder would act as a single beam of equal depth, and would appear as in Figure 46.

Letting n = number of timbers of which the girder is composed, the girder would then be very nearly n times as strong as if the timbers were merely laid on each other and not fastened. This fact shows that this form of girder should only be employed when it cannot be avoided, and that great care must be taken to fasten the timbers very firmly, so as to prevent all slipping. This may be done as suggested in Figure 47.

Modes of connecting joists and single girders.

This must be so done as not to weaken the girder, or allowance must be made for this loss of strength.

a. Joists merely rest on top of girder. Fig. 36.

The ends should overlap several inches and be well spiked together; it is also well to bridge the joints over the girder, to prevent their tipping over sidewise.

b. Joists partially notched into the girder. Fig. 37.

c. Joists gained into the girder. Fig. 38.

d. Joists tusk-tenoned into girder. Fig. 39.

The last method weakens the girder least, excepting the first, as the wood is cut away at the mid-depth of the girder, where the fibres are least strained. Only the uncut area of fibres can be considered in estimating the strength of any girder.

e. Joists supported on a plank fastened to the side of girder, and in which the gains are cut. Fig. 40.

f. Joists gained into a plank supported by Z-shaped wrought-iron straps or hangers. Fig. 41.

g. Joists hung in wrought-iron stirrups. Fig. 42.

The last three methods do not reduce the strength of the girder, and are therefore preferable for heavy floors. The last is frequently required for the ends of trimmers, etc., by city building laws.

4. Girder composed of two timbers of equal breadth. Fig. 12.

5. Composed of two timbers, the lower being widest. Fig. 13.

The last is most common, and is usually preferable.

Modes of supporting ends of joists on double girders.

These are gained into the upper timber, the two most common methods being shown in Figure 43. The right hand mode is to be preferred, since each joist must then be separately framed and is more certain to be correctly cut.

Modes of fastening together the two timbers.

a. By bolts and keys. Fig. 44.

The keys should be made of hard and well-seasoned wood, the fibres running the same way as those of the girders, to avoid effects of shrinkage, and also set obliquely as shown in the figure, so as to better resist shearing and to get the benefit of the entire end area for resisting crushing, instead of one-half this area, as would be the case were the key horizontal. At the other end of the girder the key should slope in the other direction. A key at each end will usually be sufficient, since no slipping can occur if the ends are fixed. A sufficient number of bolts must be used to hold the timbers firmly together. There is little advantage in inclining the bolts as shown by the dotted lines, unless the timber is so thoroughly seasoned that no shrinkage can take place, or the ends of the bolts are accessible, which is rarely the case.

b. By narrow strips of wood nailed on the sides of the girder. (See *American Architect*, Vol. 10, p. 5). This method is an excellent one, but is only applicable to girders composed of two timbers of the same breadth. The girder is nearly as strong as if a single timber of the same dimensions. But the joists cannot be gained into the upper timber, so that the entire depth of the girder is visible beneath and it has a rather heavy appearance.

II. — *Girders composed of wood and wrought-iron.*

There is some danger of dry-rot in this case, unless care be taken to secure ventilation and to use only thoroughly seasoned timber. Only wrought-iron plates should be used, since cast-iron is not reliable, as it is likely to have flaws, etc.

6. The ordinary flitch-plate girder. Fig. 14.

Composed of two wooden timbers between which is placed an iron plate, the whole being firmly bolted together. This form of girder is much used in St. Louis, but rarely elsewhere in the Western States, as the form shown in Figure 13 is considerably less expensive.

7. Modified flitch girder. Fig. 15.

A single wooden timber is placed between two thinner vertical iron plates, which may be fastened to it by bolts, lag or coach screws, etc.

8. Modified flitch girder. Fig. 16.

Also composed of a single timber, to which iron horizontal top and bottom plates are fastened by screws, etc.

The last two forms are new, so far as known to the writer, but the last appears to offer considerable advantage over the usual form, as it is easily constructed, and the iron plates are so placed as to do the most good, all their fibres being nearly equally strained, so that their strength is nearly double what it would be if in a single vertical plate, in a flitch-plate girder of the same depth.

9. Modified flitch girder. Fig. 17.

Composed of two timbers, between which is placed a wrought-iron I-beam. This form is also new, and would be considerably stronger than a flitch-plate girder of the same depth and weight of iron; the I-beam can also be more readily obtained and at less expense than the plate, as only its length requires a special order.

The ends of the joists are supported in one of the modes already described for single girders.

In bolting together flitch-plate girders the bolts should not be arranged as in Figure 48, but placed near the mid-depth as in Figure 59, or as in Figures 60 and 61, where a wrought-iron strap passes around the lower part of the girder, to prevent cutting the lower fibres by bolt holes. Bolt holes in the upper part are not injurious, as these fibres are in compression.

III. — *Cast-iron girders.*

Cast-iron is not a good material, since it is very liable to hidden flaws and is apt to give way without warning when subjected to heavy loads, sudden shocks or changes of loading, and its strength is greatly diminished by heat and probably by severe cold. It should not be employed for girders, but it is and will doubtless continue to be used until wrought-iron becomes considerably cheaper than it now is, and the defects of cast-iron become better known. Cast-iron girders are simple, being very rarely composed of several parts bolted or riveted together.

Since cast-iron can resist about five times as much compression as tension, it is evident that the lower portion of the section should be of considerably greater area than the upper, and this is always the case in well-proportioned girders.

Cast-iron girders require to be stiffened by cross-plates, as shown in Figures 55 and 56, to prevent the girder from giving way by tipping over sideways, or by the separation of the flanges and web at their junction. These cross-plates may be from one to two feet apart, according to the dimensions of the girder. All junctions of parts at right angles should be carefully rounded, to prevent cracks from starting there on the cooling of the girder.

Since special patterns must be made for cast-iron girders, the section of the girder is usually diminished from the centre of girder towards its ends, usually in the height of the section only. It is usual to make the end heights from one-half to two-thirds that at the centre, then striking a circular arc through the three points, which forms the top of the girder. The bottom is usually straight and the girder of uniform width horizontally.

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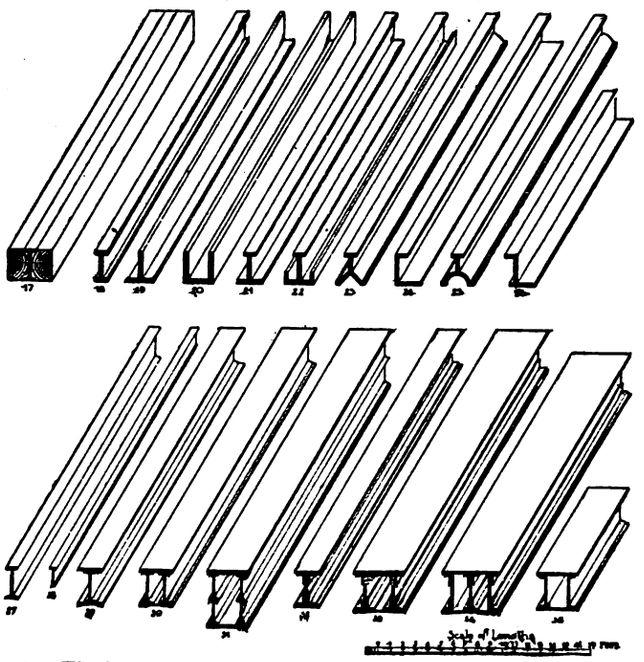
10. The I girder. Fig. 18.

This form is not now used, but was employed before Hodgkinson discovered that the lower flange should be larger than the upper.

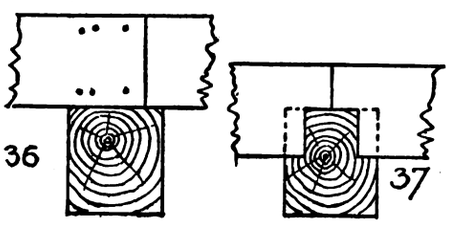
11. The inverted T girder. Fig. 19.

Sometimes used and preferable to the last, though weak sidewise.



12. The box lintel. Fig. 20.

The most common form of cast-iron girder, especially for supporting walls of masonry above the usual iron and plate-glass fronts. The girders extend from centre to centre of the columns, and have ends cast on, which are bolted together.

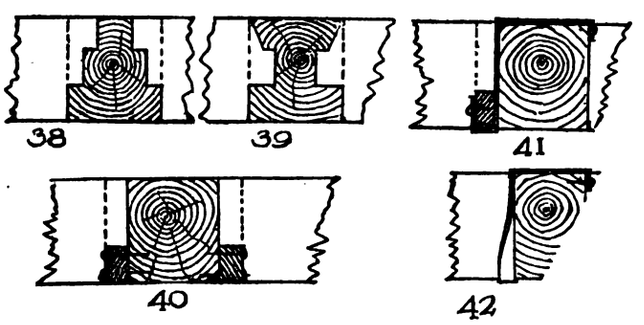


13. The Hodgkinson girder. Fig. 21.

Frequently employed, and the most economical form of cast-iron girder when it is suitable and is properly proportioned.

14. The modified Hodgkinson girder. Fig. 22.

Side webs are added, which aid in supporting the bottom plate, making the girder much stronger, especially when required to support a wall. Frequently used for supporting walls over large openings and much stronger than a box lintel of equal weight.



15. The inverted Y girder. Fig. 23.

The writer is not aware that this form is ever used in the United States, but saw it near the Docks in London. It is less economical than the Hodgkinson girder, but is better adapted for supporting the brick arches of fire-proof floors, as the skew-backs are ready formed.

16. Modified inverted Y girder. Fig. 25.

This might sometimes be preferable to the last, for the sake of appearance, and also might possess a little greater stiffness.

17. The L girder. Fig. 24.

Common; especially used for supporting the inner edges of the large stone slabs now used for city sidewalks.

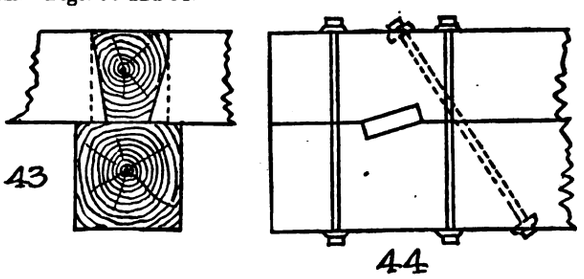
18. The Z girder.

Sometimes employed in Germany. Liable to give way by tipping sideways.

Joists or beams are attached to cast-iron girders in various ways.

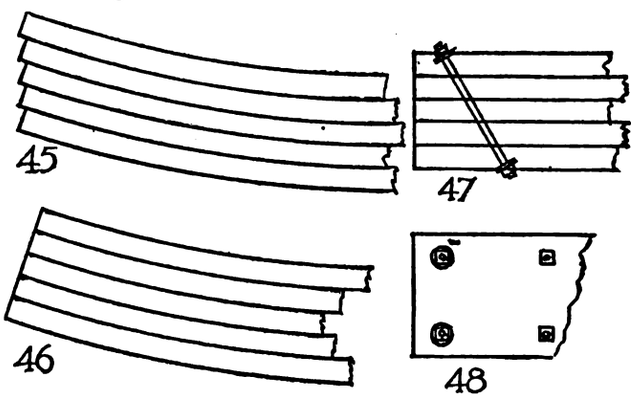
a. By merely resting on the lower flanges.

b. By means of angle pieces resembling those used for wrought-iron beams and girders, riveted or bolted to the girder and joist or beam. Figs. 53 and 54.



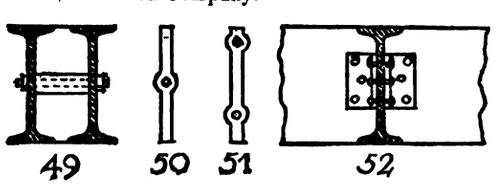
IV. — *Wrought-iron girders.*

These are much to be preferred to those of cast-iron, as they are far less liable to defects, and the process of manufacture renders them of more nearly uniform quality. In many cases they are also cheaper, and are not so liable to injury from sudden shock. They are not fire-proof, though incombustible, being much affected by heat, and therefore require protection by means of some fire and heat resisting material.



Wrought-iron girders are usually made of uniform section from end to end.

Certain stock forms are principally used in the manufacture of girders, as these can be more cheaply obtained than special forms of section, and it is essential for the architect to pay attention to this point in designing a girder. Examples of these sections can be found in the pocket-books published by the different iron manufacturers, especially in that of Carnegie Brothers, edition 1881, and in that of the Phœnix Iron Company.

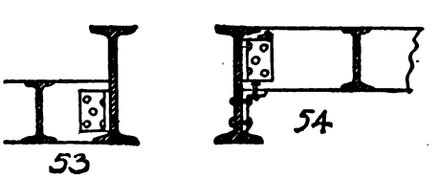


Compound wrought-iron girders are built up from the following:

a. Wrought-iron plates of various thicknesses and widths.

b. I-beams or channel-bars of various sizes.

c. Angle irons, which are principally used for connecting together the different parts of the girder.



These are fastened together by rivets, rarely by bolts, and these are spaced farther apart than in boilers. The arrangement of the rivets is usually left to the manufacturer, the architect determining the section of the girder and the kind and dimensions of the parts.

The vertical plates or webs are usually quite thin and require to be stiffened, which is usually done by riveting on vertical T-bars with the stems projecting as shown in Figures 57 and 58, in horizontal section.

19. The I-beam or girder. Fig. 27.

Sometimes used singly as a girder, but more commonly as a floor joist.

20. The deck beam or girder. Fig. 28.

Chiefly used as a floor joist in ship-building.

21. The double-I girder. Fig. 49.

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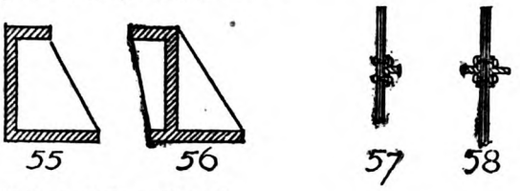
Composed merely of two I-beams placed side by side, with cast-iron separators placed between them, shown edgewise in Figures 50 and 51, and then bolted together. This has no top or bottom plates, but makes a very good and cheap girder for supporting walls over openings, etc.

22. The I girder. Fig. 29.

Composed of an I-beam and top and bottom plates riveted on each flange of the I-beam. Liable to tip unless the vertical web is carefully stiffened by vertical T-bars.



23. The box girder. Fig. 30.

Composed of two I-beams with top and bottom plates. An excellent and economical form, especially for heavy floors, supporting walls, etc.

24. The U. S. box girder. Fig. 31.

Composed of top and bottom plates, with four I-beams placed in two tiers and riveted together and to the plates. This is much used in the construction of buildings for the United States Government, and is excellent, as a much deeper girder can be constructed than is possible with a single depth of I-beams. It is also quite stiff sideways. Not quite so economical theoretically as the form shown in Figure 33, but probably as cheap practically.

25. The I girder. Fig. 32.

Composed of top, bottom, and web plates, with four angle irons. May be made of any size, but must have vertical stiffening bars.

26. The ordinary box girder. Fig. 33.

This is the usual form, and is composed of top, bottom, and two web plates, with four angle irons.

27. The double box girder. Fig. 34.

Similar to the last, but having an additional web and four more angle irons. Sometimes preferable, especially for very large or heavily loaded girders.

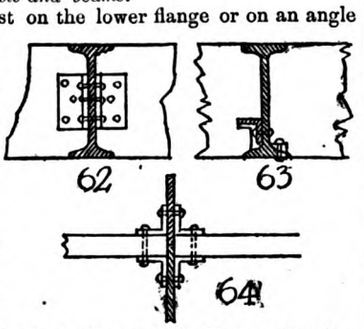
28. The box girder. Fig. 35.

Composed of top and bottom plates with two channel-bars. Rarely used, except for very light work.

Wrought-iron requires careful protection from dampness or water; large girders should therefore be painted inside before they are put together, unless large enough for a man to crawl through.

Mode of supporting joists and beams.

a. Wooden joists either rest on the lower flange or on an angle iron riveted to the side of the girder, as in Figure 63. They are held in place by angle pieces riveted or bolted to the side of the girder and through the joist, as shown in Figure 62, or in horizontal section in Figure 64.

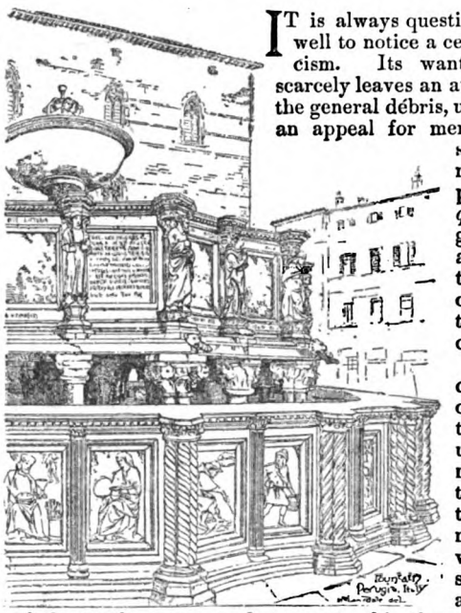


b. Iron beams, if of the same depth as the girder, rest on its lower flange, and are held in place by angle pieces, as in Figure 52. If of less depth, they rest on an angle iron as in Figure 54, or on the lower flange as in Figure 53, when the girder is not to be visible beneath.

LEGAL CASE ARISING OUT OF THE NICE THEATRE DISASTER. — The tribunal of Nice has given judgment in a suit arising out of the fire at the Italian theatre in that town. After that calamity a subscription was opened for the families of the victims, and a committee was organized by the municipality to preside over the distribution of the funds raised. The majority of that body, in spite of strenuous opposition from the minority, required from some of the parties relieved a receipt by which they renounced all right to bring any further claim against the committee, the town of Nice, or any other person, with regard to the fire, declaring themselves satisfied with the compensation given. Some of the parties, however, repudiated that engagement, and claimed compensation from the municipality, which replied that the applicants were barred by their receipts. The affair has come before the Tribunal of Nice, which has given judgment that the condition was void. It has still to decide who is responsible for the fire, and must indemnify the sufferers by it, also whether the sums received from the produce of the subscription shall be deducted from the damages that may be awarded, or not be taken into account. —*Fireman's Journal.*

ARCHITECTURE IN AMERICA.

VENICE, ITALY.



IT is always questionable whether it is well to notice a certain class of criticism. Its wanton destructiveness scarcely leaves an available ruin, amidst the general débris, upon which to fasten an appeal for mercy. The only resource, to impugn its method seems unpleasantly like a "*tu quoque*" form of argument. Mr. Cook's article upon architecture in America obviously belongs to this class of criticism.

There was an ancient and time-honored custom amongst the Malays, when under mental excitement, which allowed them to dispose of their neighbors summarily, with any weapon that presented itself. It was a rapid method for quieting one's opponents, but open to objections: it seemed to imply a mental inefficiency to deal with that kind of a problem. Activity of that sort raised more opposition than it subdued, and could hardly be called praiseworthy. Criticism, however, occasionally adopts such a method, and in such cases need expect to be considered accordingly.

Hamerton states in his paper upon art criticism, which we hope Mr. Cook has read, that one of the duties of the art critic is that "of defending true living artists against the malice of the ignorant;" and proceeds, "A peculiar form of this duty is the defence of young artists whose powers, as yet, are but imperfectly developed." This duty Mr. Cook naturally evades; possibly it may be but an unwieldy, two-edged sword in his hand, with the backward edge uncomfortably sharp. However that may be, the feeling that *noblesse oblige* may even be rife amongst critics without sensibly diminishing their influence, and the "little wanton boys" upon their "sea of glory" whose brilliancy naturally blinded their eyes to the merits of Mr. Cook, may justly think that they deserve at least the right of attention.

We appeal to Mr. Cook's mercy and will try to give some reason for our being, apart from that of being toys for critics of his calibre.

Versatility of powers is given to but few men to any extent, and the general tendency is for men to become specialists. The architect's "specialty" can hardly be called by that name, as it embraces a number of subservient specialties and is greatly benefited by contact with the world of letters upon the one side, and that of the artisan upon the other. It is rather a well-balanced collection of specialties.

To occupy such a position successfully necessitates long and varied study and much discrimination and judicious application. Distasteful as well as tasteful subjects must be assimilated. The usual tendency upon the part of the younger men is towards partiality in certain directions. They naturally make mistakes; it is almost their prerogative. To be perpetually *en regle* would be apt to imply monotonous mediocrity.

Is it not more the duty of the critic to encourage the good intention which created the mistake than to sneer at the failure? Eclecticism is a hard mistress, and yet the only true one. Liberality in education only too frequently becomes merely superficial; but is that any argument against a liberal education? In the name of common sense, what is it that Mr. Cook would have us do?

We study in "studios and offices," and make "pedestrian tours," and apparently to no purpose. What substitute has Mr. Cook to offer for the attainment of what he appears to be anxious for, that "every building should show itself fitted by its plan and proportions for human occupation and enjoyment?"

It has been thought to be an axiom among architects that one of the tests of skill was the power of making as grateful to the eye as possible an exterior or an interior which from mere utility would be offending. Therein it was thought lay the principal *raison d' être* for the artistic education of an architect.

Apparently we must reform all that. Mere utilitarianism has, we will say, usually the tendency to be naturally beautiful (according to Mr. Cook), the innate hideousness of many small, active American and European towns to the contrary notwithstanding. It is an old doctrine; but is it not barely possible Mr. Cook may have overlooked the important factor of time as a beautifier?

The second and complementary reason for the existence of the architect was closely allied to that for a military commander — his position was to be paramount, his decision arbitrary and final. Somebody nad to decide necessarily: the proprietor, who occupied somewhat the position of a Home Government, neither having time

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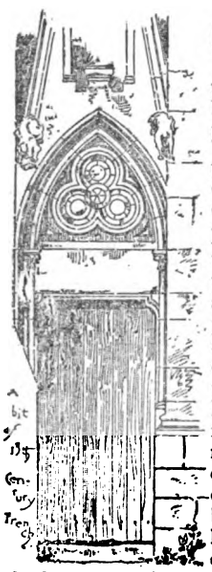
nor knowledge to attend to detail, but holding the power of criticism and removal. Under such a state of things the builder would necessarily take a "back seat," and the chief difficulty has been that he has not been sufficiently held there: the obvious reason for the supremacy of the architect being that *very* liberal education which Mr. Cook at one moment seems to depreciate, and at the next to eulogize. Has Mr. Cook any better system of relative positions to advocate?

It would be superfluous to formulate the architectural creed of the younger men. It undoubtedly differs somewhat with each individual, and with each has many flaws; but the doctrine of simplicity is by no means original with Mr. Cook, or absent in the code of the young men; on the contrary it is nearly universal. But simplicity, with most people, is an acquired habit. Youth naturally delights in exuberance, and a wall-surface is as tempting to a young architect as a sheet of white paper to the embryo artist. The artist later has the advantage that he can focus his subject and get simplicity by the mere suggestion of surroundings; while the architect is bound to rigid line and tint, and must balance his proportions with much more nicety than Mr. Cook does his opinions.

We are entering upon the field not without timidity, with the intention of using what advantages we may possess to the best of our abilities. The intention is certainly not to erect unworthy buildings; it certainly *is* to try for an intelligent and just respect, and it would be pleasant to hear some tones of appreciative regard even from Mr. Cook.

C. Howard Walker.

GAS-BURNERS.[1]



COAL-GAS, as now supplied to the public, consists of hydrogen and marsh-gas to the extent of about 80 per cent, and the remainder consists of luminous hydro-carbons of various qualities, with traces of sulphur in the form of disulphide.

The gas-supply of London is watched over by a Commission, appointed by the Board of Trade, called gas-referees, who are Professor Tyndall, Professor Vernon Harcourt, and Mr. Pole. They are empowered to prescribe the manner of verifying the illuminating power and purity of the gas, and they have also authority to act in cases of dispute in public lighting. Their prescriptions, as emanating from the only legal body in the kingdom, are accepted as the proper methods, so that in effect, though they are appointed in London, they may be said to be gas-referees for the whole kingdom. But the use that is made of gas is a matter which is altogether out of the control of gas-companies and their engineers, and here the proverb about food and bad cooks may be paraphrased. The great hinderance to the improvements in the use of gas has been the general public themselves, who have not taken sufficient interest in the kind of apparatus employed, but have, as a rule, supplied themselves with the cheapest burners, stoves, and other apparatus, utterly regardless of the waste and annoyance which this system entailed; and when they have complained, they have always attributed the causes of failure to the quality or pressure of the gas, instead of ascribing it to the true cause.

In 1871, the gas-referees made an examination of a number of gas-burners which they had collected from various large establishments, newspaper offices, warehouses, shops, and dwelling-houses, and they found that those burners (samples of those generally employed by the public) would only give about one-half the light that the gas was capable of yielding per cubic foot consumed, and several of the burners tested by them gave only one-fourth of the proper light of the gas.

They say in their report to Parliament: — "The economy to the public, arising from the use of good gas-burners instead of bad ones, is so obvious as hardly to need remark. The gas-rental of London amounts annually to more than two millions sterling. Taking a very moderate estimate, upwards of one-fourth of this sum (£500,000 per annum) might be saved by the use of good burners. This is the saving which might be made in London alone; how much vaster the sum thus economized if good gas-burners were to come into general use throughout England."

Now, the quantity of gas used in London last year, according to the analysis of the London Gas Companies' accounts, prepared by Mr. John Field, was, in round numbers, 20,230,000,000 cubic feet, which is equal to a bulk of one mile square by 726 feet high, and its cost to the public was £2,911,000.

The result of careful trials, made with a number of burners taken lately from private houses and shops, shows that, as a rule, the amount of light obtained by the general public, from five cubic feet of gas, is less than one-half of that which it is capable of giving. The iron and metal burners, of which a great many are used, give the best result in light when they are worn out, although the shape of the flame is bad. The reason why, is that in order to obtain from what is a compound of hydrogen, marsh-gas, and carbon, its best effect in light, the burner must be so made that the quantity of gas required to be consumed is proportionate to the size of the burner, so that it cannot exceed the maximum quantity which the burner is made for. Then the outlet of the burner itself, whether it be of the argand or the flat-flame form must be so arranged that the gas issues forth at a sufficiently low rate of velocity, so that it has time to get heated to a proper degree by the hydrogen and marsh-gas before it comes into combustion with the oxygen of the atmosphere. When this rate of velocity is obtained in an argand burner, the pressure at the point of ignition is almost *nil*. In flat-flame burners the pressure of the gas must be raised to a point sufficient to blow out the flame to a fan-like shape, but it must only be sufficient to do this if it is desired to obtain a good result per cubic foot of gas consumed.

One more point is of great importance in the construction of a gas-burner: that is, that the gas should not be heated until it arrives at the point of ignition. The body of the chamber below the point of ignition must therefore be made of material which is a bad conductor of heat, so as not only to prevent the undue expansion of the gas before it arrives at the point of ignition, but also to maintain the heat in the flame.

Sir Frederick Bramwell very ingeniously pointed out, some time since, that the important point in the proper combustion of gas is not so much to keep the gas cool as to keep the flame hot. The distinction is extremely subtle; but, nevertheless, a non-conducting gas-chamber performs both these important functions. If a gas-chamber made of metal or any good conductor of heat is used, then the gas becomes expanded in bulk and the velocity of the issuing gas is greatly increased, less time being given for chemical combinations necessary to produce a proper amount of light from it. In addition to this, as Sir Frederick Bramwell has pointed out, the heat which should remain in the flame is conducted away from it into the lower fittings of the burner, where it may burn the fingers of the incautious consumer, but it is of no manner of use in the evolution of light.

You will, perhaps, say it is not possible to conceive how the flame can be kept hot without keeping the gas cool at the same time, because if the heat is to be kept in the flame, and not conducted away down the stem of the burner, the gas must be kept cool by the means employed. But nevertheless there is a difference in the effects produced, and the ingenious definition of Sir Frederick is scientifically accurate. As an explanation of the expansion theory, it may be stated that if one cubic foot of gas is heated to about 500° Fahr., it will occupy the same bulk that two cubic feet do at the mean temperature of the atmosphere. Now, supposing it is issuing in a cool state from the aperture of the burner at a velocity equal to one and a half miles per hour, it must then issue at the rate of three miles per hour if the rate of consumption is equal in both cases. Therefore it has only half the time in the heated state to combine with the oxygen of the air that it had in the cooler state, and a loss of illuminating power is the result. Again, as regards the maintenance of the heat in the flame: supposing the chamber from which the gas issues is a conductor of heat. In this case, the heat from the flame is conducted away from it down the stem of the burner, expanding the gas and leaving the flame so relatively cooled as to require more gas to raise it to the necessary state of incandescence to allow the oxygen to combine with it in the proper proportions. In this case, as the two operations are simultaneous, it is difficult to apportion the effect produced; but that the effect is produced is proved by the following experiments, made some time since by the late Mr. F. J. Evans.

Two argand burners were made precisely alike in every respect except that one had a combustion-chamber made in steatite, and the other in brass. The same quantity of gas was consumed through both of these, the result being that the burner with the non-conducting chamber gave more light per five cubic feet of gas consumed than the other, the proportion being as fifteen candles to thirteen. The burner with a non-conducting chamber was quite cool immediately below the chamber, while the other was so hot that it could not be touched without burning the hand. The metal burners which are now used in enormous quantities in London and the provinces become exceedingly hot, so much so as to communicate the heat to a considerable distance down the fittings. The velocity of the issue of five cubic feet per hour of gas from these burners varies from ten to sixty miles an hour. The worn-out burners generally give the lowest velocity. As a rule the metal burners give the lowest result in light per cubic foot of gas consumed.

For example, a metal burner of the flat-flame type, which has been stated in the columns of the *Journal of Gas-Lighting* to be identical with the steatite hollow-top burner, invented in 1868, gives the following results: a large-sized burner, No. 8, burning five cubic feet per hour, gave a result equal to 11.5 candles, whilst the result obtained with a like quantity of gas from a steatite burner of corresponding size, which has a non-conducting gas-chamber was 14.5 candles, a difference in favor of the steatite of 3.1 candles, or nearly 25 per cent more light. Another metal burner, of a size more generally in use by the public, only gave 6.2 candles for the five cubic feet, or considerably less than half the latent value of the gas, which was 16 candles.

The fact of the difference of illuminating power with like quantities of gas clearly shows that the two burners are not the same by

[1] Abstract from a paper by William Sugg, A. I. C. E., read before the Mechanical Section of the British Association, at Southampton, and published in the *Journal of the Society of Arts.*

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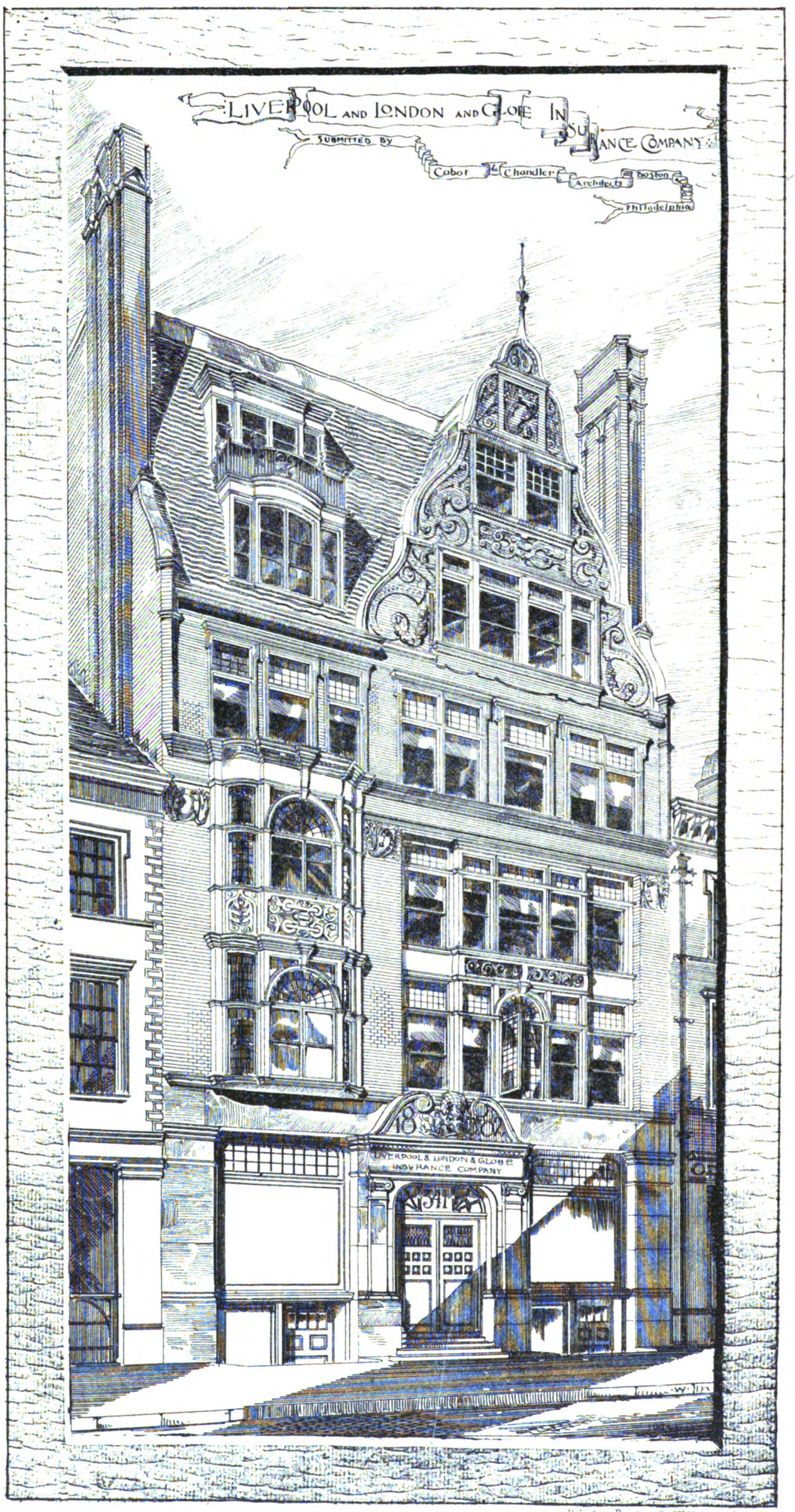
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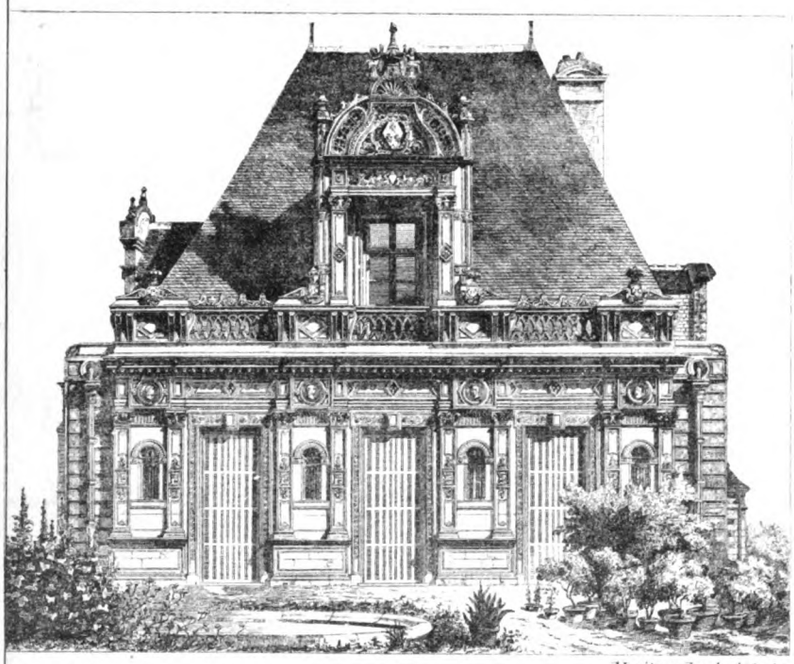

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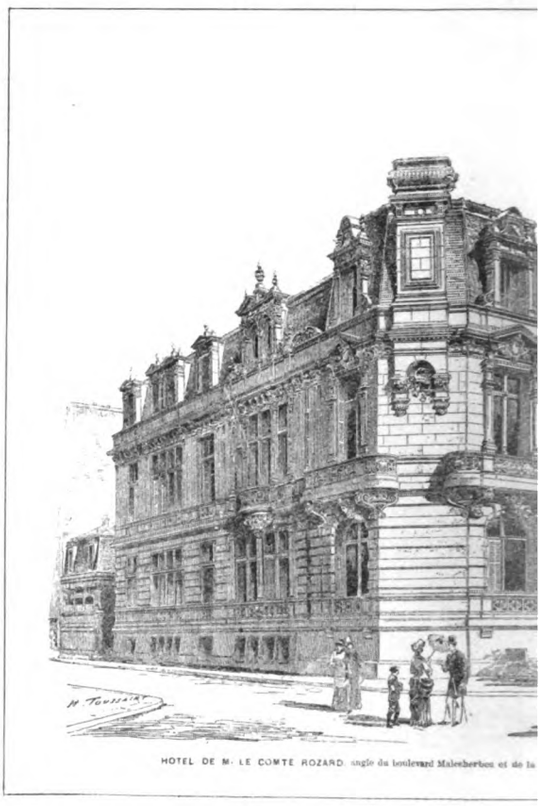

HOTEL DE M. LE COMTE ROZARD, angle du boulevard Malesherbes et de la

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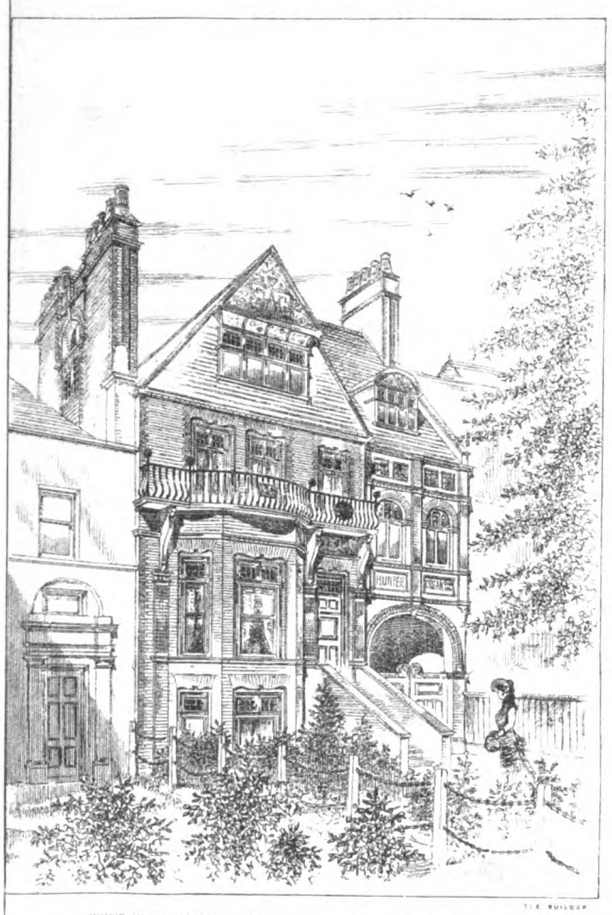
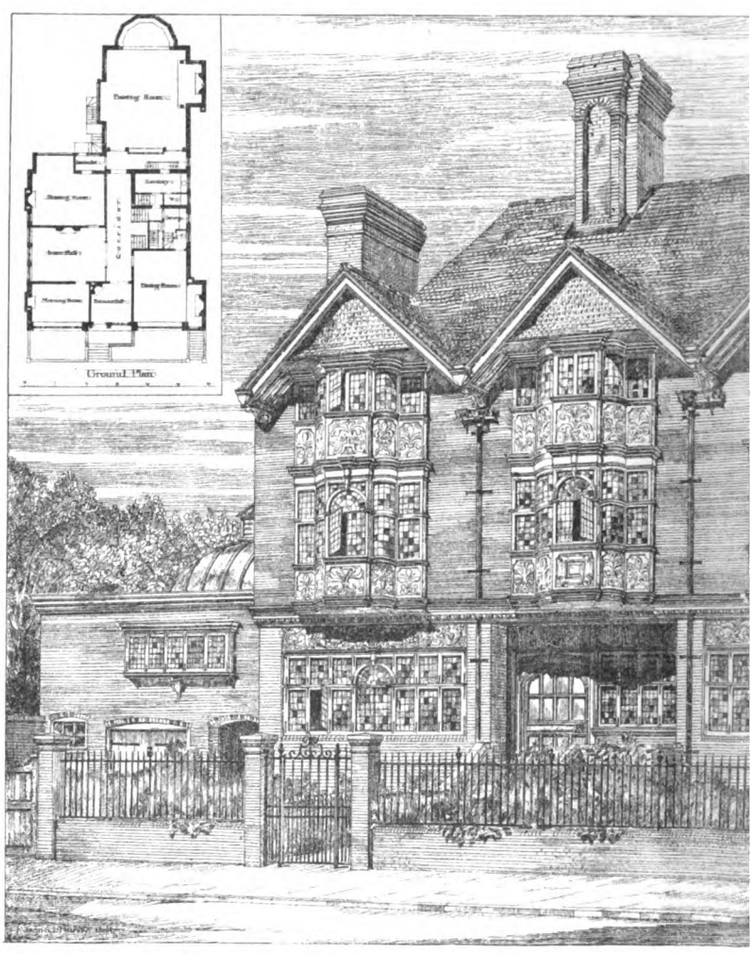


HOUSE IN THE CLAPHAM ROAD, LONDON. Mr. Sidney K. J. Smith, Architect.



ARTISTS' HOMES No. 19. THE House and Studio of FRANK HOLL Esq.re A.R.

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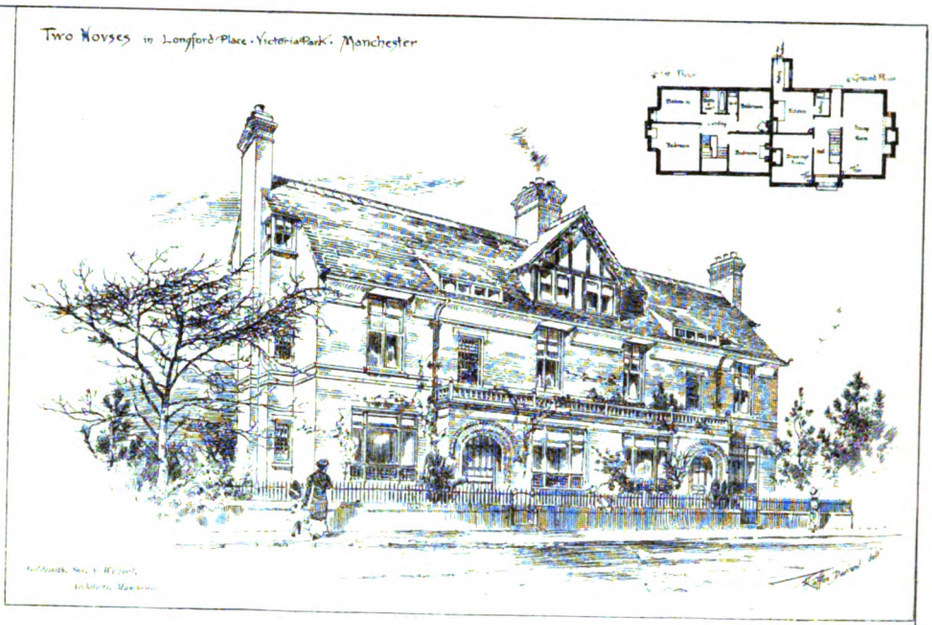
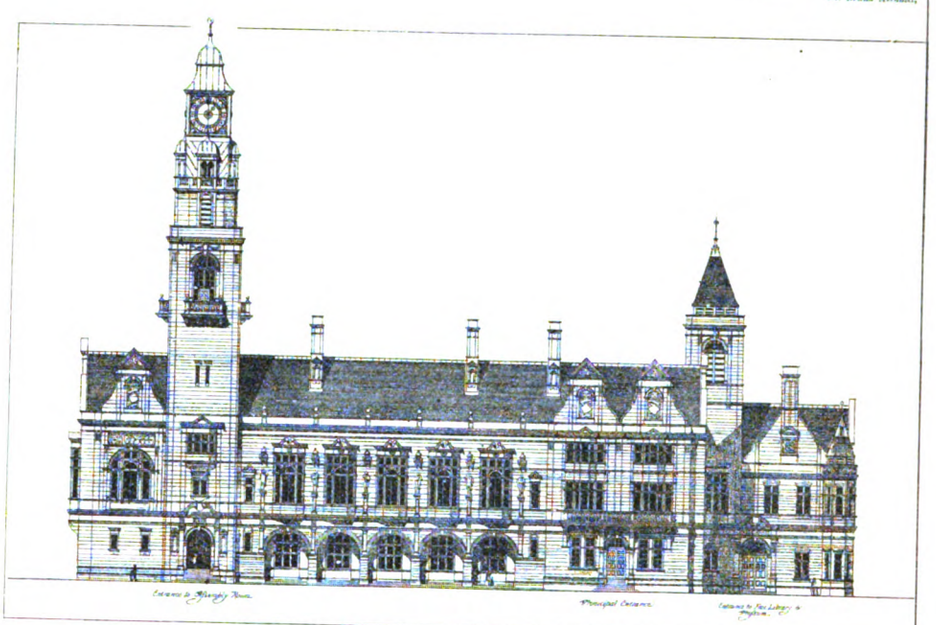


The British Architect.



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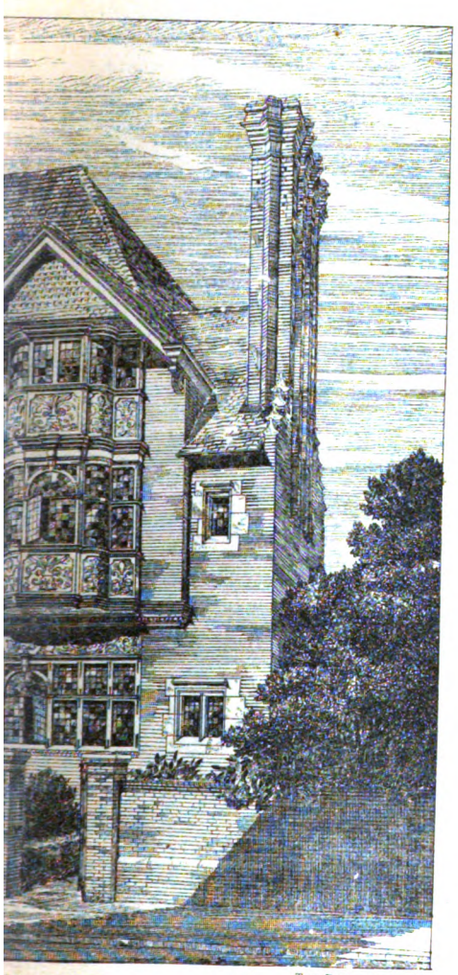

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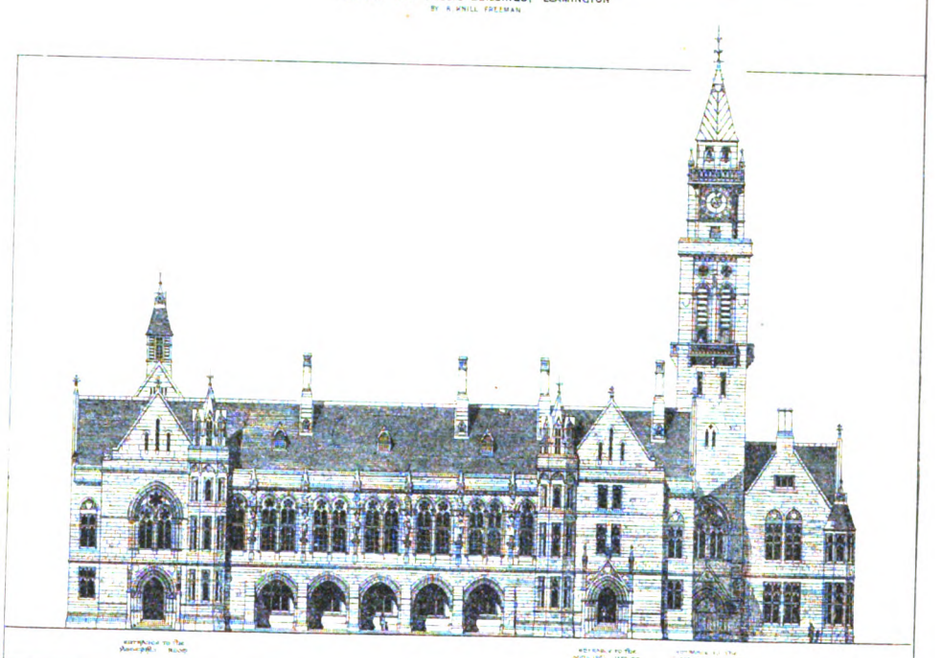

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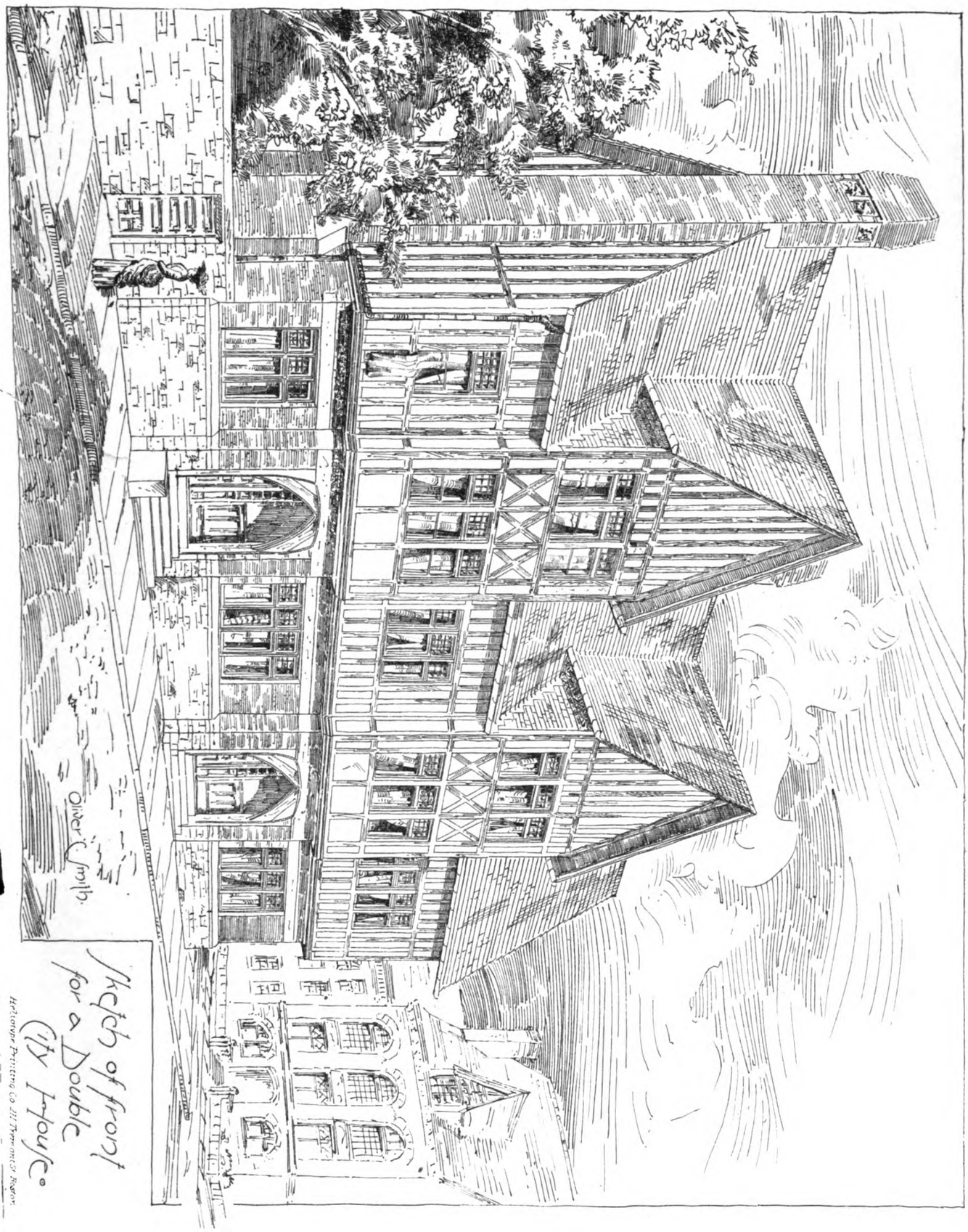

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any means. The statement gravely made in the columns of the *Journal of Gas-Lighting*, that they are identically the same, clearly shows that if this is the belief of the gas-trade generally with respect to these two burners, it is no wonder that the public, who rely on the recommendations of the trade, continue still to waste their gas in the manner pointed out by the gas-referees in 1870 and 1871.

As before stated, careful tests of a collection of burners, bought from different gas-fitters and iron-mongers in various towns in England, and from their recommendation, prove that the knowledge of the proper use of gas possessed by these persons is still most incomplete, and therefore the general public continue still to burn gas in the same wasteful manner as they did when the gas-referees made their report.

The remedy for this enormous waste of gas is in the hands of the public only. Gas-producers, whether they are corporate bodies or public companies, are almost powerless to oppose the vested interest which derives large profits from the sale of gas-burners constructed with a view to require frequent renewals. It is only fair to say that the producers of gas have always shown the greatest interest in the improved use of gas in every way; but the speculating builder and his colleague, the local plumber and gas-fitter, hold a final power for evil over the employment of gas, which till very lately has been paramount.

Happily for the gas interest, the general public are beginning to take a deep interest in gas, and are acquiring a great amount of information concerning it, through the numerous gas exhibitions which have been held under the auspices of gas-companies and corporate gas-committees throughout the kingdom, and it is to be hoped that the forthcoming exhibition at the Crystal Palace, in October, will very largely aid the good work of instructing the public how to use gas to the best advantage. Thus we may hope that soon the ring of interest inimical to the progress of gas will be broken through and fresh encouragement given to the inventors of improvements in the use of gas. It will be impossible, in the limits of this paper, to give you a complete idea of all the improvements which have been and are still being made; but I propose to indicate the direction they are taking, and give you a general idea of what they are.

It has been found that a comparatively large quantity of gas, about four to six times that ordinarily used, will give a much better result from one burner per cubic foot of gas consumed than can be obtained from four or six separate burners consuming the aggregate quantity of gas equal to that consumed by the large one, and this is true of both argand and flat-flame burners. This is by no means a new idea; it was known to Faraday and others before him. I have in my possession an old burner made many years ago; it has several rings and a silver top drilled with very fine holes. The quantity of gas used is large; the effect is small — in fact, it is more useful for boiling water than for giving light. But this old burner is a type of a large argand of twenty or thirty years ago; they did not succeed because, although they produced a great amount of light, it was at the cost of too much gas. Modern argands will produce just double the amount of light for the same quantity of gas.

There is also incorporated in some of the newest burners now before the public an idea which was originated by Professor Frankland more than ten years ago, viz.: that if the air for combustion supplied to a burner be heated before it arrives at the point of ignition, a much better result per cubic foot of gas consumed can be realized. This, you will perceive, is a mode of carrying out Sir Frederick Bramwell's idea of keeping the flame hot, and undoubtedly a better result can be obtained. This burner, although it did not come much into use, has very lately been repeated, and is now being sold on the Continent. The burner is so much like Dr. Frankland's that there is no difficulty in recognizing it at once.

Of the modern argands there are now several kinds; one is made with two or three concentric rings of flame and a glass chimney, and is made with non-conducting steatite gas-chambers and apertures permitting the gas to issue under an almost inappreciable pressure at the point of ignition, the velocity per hour being only about one and a half miles. In this kind of burner the gas is kept cool and the flame hot. These were first used in the public lighting of Waterloo Road in 1879, and in Waterloo Place and Queen Victoria Street.

Another kind, of newer type, is made on the theory of keeping the flame hot by making use of the products of combustion to heat the air-supply; this also combines the low velocity of emission theory, and likewise heats the gas itself. It is made by inverting the flame of the burner, the heat generated by the products of combustion being carried away by a concentric flue fastened round the burner, through which metallic tubes convey the air necessary to produce combustion, which thus becomes heated.

A third is constructed on the principle of keeping the flame hot and the gas cool, but has besides an arrangement for admitting separate currents of cold air round the flame, for the purpose of keeping the chimney cool. It is important to observe that, although this burner does not warm the air admitted to it for promoting combustion, yet the results per cubic foot of gas consumed are stated to be as high as any of the others, showing clearly that there is no advantage in heating the gas before combustion. As to the advantage obtained by heating the air, the practical effect upon an argand suitable for use by such ordinary unskilled labor as is usually employed to look after gas-lights has not yet been clearly demonstrated; although it is without doubt a great advantage to burners of the flat-flame type, because these have always too much cold air supplied to them.

The argand, with its more complete regulation of air and its immunity from the effect of surrounding cold air, is able to evolve from fifteen to thirty per cent more light per cubic foot of gas consumed than can be obtained from the best flat-flame burner; but although the general public have no objection to glass chimneys in paraffine and other oil lamps, they do not appear to look with favor upon the general employment of glass chimneys for gas-burners, no matter how much better the result to be obtained. I need not say that the cordial support of the ring inimical to the true interests of gas is given to the public on this point, and a great deal of very strong literature condemnatory of the argand burners has been widely disseminated. But it is impossible, in the face of the improvements which are continually being made in gas-burners of the argand type, to believe otherwise than that they are destined to play an important part in the gas-lighting arrangements of the future. The improvements in the flat-flame burners, though not producing such high results as those obtained from large argands, are great, and concurrently with improved lanterns have placed the lighting of the public streets on a much improved footing. Here, again, about three times the amount of light per cubic foot of gas is obtained from the use of large burners than with the old-fashioned small ones. The consumption of gas by the large ones is only equal to the aggregate consumption of four or six smaller burners. In addition to this, the improvements in the reflecting tops of the lanterns make the new lamps still more effective, and may fairly be said to double the effective power. In internal lighting the progress of gas has been very considerable of late years. Small burners for rooms have been greatly improved; for large rooms and theatres new kinds of sun-burners are made, to give three times the amount of light obtainable from the old ones, and to ventilate the buildings at the same time.

One of the greatest advantages of gas is that the heat generated by the combustion can, if properly applied, be made to do the work of ventilation, and it is in this direction that the future progress of gas-lighting lies. There are many ways of utilizing this heat; some are extremely easy to put into practice, others require more preparation. Among the simplest is the method of ventilating rooms by the fish-gill ventilator, invented by the late Goldsworthy Gurney. It consists simply in covering an opening made in the wall with strips of calico fastened across the hole by tacks put into the two upper corners of each band. The bands are made just long enough for the lower part of the superior band to cover the top part of the inferior one. When fixed properly they open like the gill of a fish, hence the name. They can be used to let in fresh air or carry off heated air from the top of a room.

These useful and simple ventilators, if employed in rooms where gas is used, would tend greatly to the comfort of the public, who require a good light, but complain of the resulting heat. They work when closed by diffusion, the heated air passing through the porous medium of the calico, and the cooler air from outside the rooms passing in without draught. For the ventilation of ball-rooms it is very easy to put into the windows a frame fitted with muslin or washed calico of half or even the full size of the window. Ventilation will thus take place by diffusion, and the draughts and danger resulting from incautiously-opened windows will be avoided. If the wind blows hard on this opening it may be protected by a loose curtain of muslin or calico hanging in front of it.

You will perceive, therefore, from what I have said, that the progress of invention in gas-lighting is great and continuous, and that in the future, if the public will only interest themselves just sufficiently to obtain a moderate amount of information on the subject of gas, they will be enabled to use it with great economy and comfort to themselves in every way. The facile manner in which gas can be employed to produce the light of a rush-light or the blaze of a thousand candles by the mere turn of the wrist, joined to the readiness with which it can be conveyed to great distances without any practical loss, will always ensure a large and growing demand for it everywhere.

But it must be remembered that its extreme adaptability renders it capable of being used with the most crude apparatus as well as the most perfect, and when we see in the public streets the blazing pipe and shovel, a rough but powerful burner of from one hundred to six hundred candles power, rigged up in a few minutes by a navvy, we must not be surprised at the prevalence of crude apparatus of smaller dimensions put into practice by the public, who are not aware that they can do better with a more perfect burner.

London Theatres. — Statistics have been published in London showing the seating capacity of each theatre in the metropolis. The one that has the largest is the Britannia, which will seat 2,972; next comes the Standard, 2,878; then Drury Lane, 2,781; Her Majesty's, 2,444; Covent Garden, 2,299; and the Alhambra, 2,208. Of other well-known houses the capacity is as follows: Sadler's Wells, 1,568; Lyceum, 1,455; Adelphi, 1,367; Savoy, 1,274; Gaiety, 1,243; Haymarket, 1,158; Globe, 942; Vaudeville, 792; Court, 728; Strand, 704; Criterion, 675; Toole's, 657; Prince of Wales's, 504. For the 41 houses the total is 55,326.

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THE ILLUSTRATIONS.

SEMI-DETACHED HOUSES IN VICTORIA PARK. MESSRS. GOLDSMITH, SON & WELFORD, ARCHITECTS, MANCHESTER, ENGLAND.

[From the *British Architect*.]

THESE houses have been built with a view to get something different from the ordinary, both in plan and elevation; and an effort has been made at the same time to insure that they shall be well built and moderate in cost. The dining-room is an exceptionally large room, running from front to back and lighted at both ends; it contains an arched recess for the fireplace, which has two small tinted glass windows forming peep-holes looking out back and front. The halls and staircases are also wider and better lighted than is usual in this class of houses. This is done by returning the stairs over the entrance, and thus getting a staircase window. There are detached wash-houses and coal-places connected to the houses by covered ways, keeping all steam and dust out of the houses. Each house contains four bed-rooms, bath-room and lavatory, water-closet on first floor, and two large bed-rooms and box-room on second floor. These upper rooms are lit by angle windows, from which very extensive views are obtained. The houses are fitted up with slow-combustion grates, tile-hearths, and curb-fenders. The dining-room chimney-pieces with over-mantels are of wood, with bevelled mirror, and the drawing and dining rooms have dado and frieze moulds round each. The halls are paved with marble mosaic tiles in patterns. The drains are of glazed earthenware pipes carried outside the houses, and at the bottom of each soil-pipe is a Potts's patent Edinburgh air-chambered sewer-trap, the soil-pipes being carried up to eaves as a ventilator. The bath-boilers are of copper, and the cylinder is encased in an air-tight chamber having a fresh-air inlet, and a hit-and-miss grid into hall; this being opened in the winter heats the halls and staircases.

HOUSE IN THE CLAPHAM-ROAD, LONDON. MR. S. R. J. SMITH, ARCHITECT.

[From the *Builder*.]

The house is built of bright-colored stock and rubbed red brickwork, with a Portland-stone balcony and cantilevers under; the gable of the house in the lower part is tile-hung, and the cove and upper part are finished in plaster-work, carved and stamped by the architect. The roofs are covered with red tiles. The whole of the window-frames are shown outside, and have a moulding round where they meet the brickwork, the upper lights of windows above the transoms have lead glazing in, and all the wood-work throughout is painted white. A pleasing feature has been introduced at the side of the house, where a window which lights the upper staircase is brought between the two chimney-stacks with an arch over. A large organ factory has been erected at the back of the house, from which it is separated by a court-yard, and the archway at the side is made so that carts can have access to it. There is a large show-room above the archway nearly the whole depth of the house in length. In the interior there are some turned newels, balusters, and other wood-work, in old-fashioned style. The chief aim in all the work has been to keep close to the homely English brick style, which prevailed in the last century.

ARTISTS' HOMES, NO. 19. — THE HOUSE AND STUDIO OF MR. FRANK HOLL, A. R. A., HAMPSTEAD, ENGLAND. MR. R. NORMAN SHAW, ARCHITECT.

[From the *Building News*.]

We reproduce Mr. Norman Shaw's Royal Academy drawing for this year, Mr. Frank Holl's new house in Fitz-John's Avenue, at Hampstead. The plan shows the principal arrangements of the building, in which a large studio is reached by a direct corridor from the entrance porch. The materials are red brick and Broseley-tiles, the wood-work being painted a cream-white, and quarry glazing being used throughout for the windows.

ALTERNATIVE DESIGNS FOR THE PUBLIC BUILDINGS, LEAMINGTON, ENGLAND. MR. R. K. FREMAN, ARCHITECT.

[From the *Architect*.]

CHATEAU DE SAINT AIGNAN, FRANCE.

[From *Le Moniteur des Architectes*.]

HÔTEL OF M. LE COMTE DE ROZARD, PARIS, FRANCE. M. L. COCHET, ARCHITECT.

[From *La Semaine des Constructeurs*.]

COMPETITIVE DESIGN FOR THE LIVERPOOL, LONDON AND GLOBE INSURANCE BUILDING. MESSRS. CABOT & CHANDLER, ARCHITECTS, BOSTON, MASS.

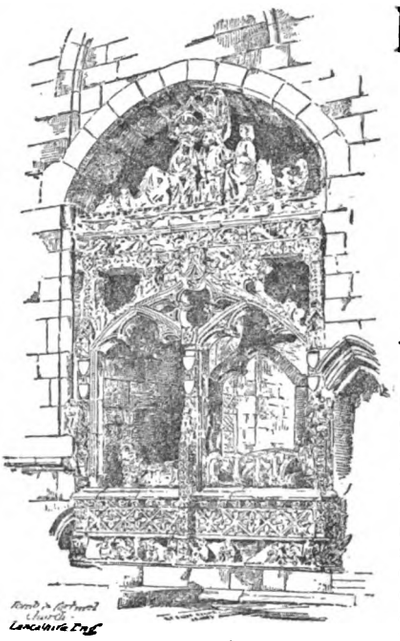
This design was not accepted for execution.

SKETCH FOR A DOUBLE CITY HOUSE. MR. OLIVER C. SMITH, ARCHITECT, PITTSBURGH, PA.

GALLERY OF MODERN ART AT ROME. — The King of Italy has signed a decree for a gallery of modern art at Rome. It will be situated in the cloister of Michael Angelo, in the Baths of Diocletian, and will be opened next month. There will be 100,000 francs annually in the budget for the purchase of works by contemporary artists.

LEGAL NOTES AND CASES.

Mechanic's Lien. — Against Husband. — Wife's Interest in an unexpired Lease for Nine Hundred and Ninety-nine Years.



IN an action to foreclose a mechanic's lien filed for services rendered to a husband in erecting a dye-house on land which his wife held as owner of an unexpired term of nine hundred and ninety-nine years, the lienor was defeated, on the ground that the interest of the wife was personal property, to which the husband had no claim. In this case, *Flannery vs. Rohrmayer*, decided by the Supreme Court of Errors of Connecticut, at its last term, Judge Loomis delivered the opinion, the important part of which is as follows: To entitle the petitioner to a sale of the land in question he must show that he has acquired an interest in it. The only interest claimed was derived from the filing of a mechanic's lien for services rendered to George Rohrmayer in the erection of a dye-house on the land, and a subsequent foreclosure of that lien. If Rohrmayer had any interest subject to a mechanic's lien, then it must be conceded that the proceedings referred to had the effect to transfer that interest to the petitioner; but he had only such interest as the law gave him by virtue of his marriage in 1863 to Mary Rohrmayer, who afterwards, on the 1st of December, 1877, became the owner of an unexpired term of a lease of the land for nine hundred and ninety-nine years. And what interest was that? Obviously not that of a tenant by the courtesy initiate, for only estates of inheritance are subject to such a tenancy. 1 Hilliard on R. P. p. 117, § 15. The wife's estate was a mere chattel real. In *Goodwin vs. Goodwin*, 33 Conn. 314, it was expressly decided that an estate in land for the term of nine hundred and ninety-nine years, subject to the payment of an annual rent, is personal property, and that the widow of the tenant could not claim dower out of it. It is elementary law that "chattels real are interests annexed to or concerning realty, as a lease for years of land; and the duration of the term of the lease is immaterial, provided it be fixed and determinate, and there be a reversion or remainder in fee in some other person. It is only personal estate if it be for a thousand years. Falling below the character and dignity of a freehold, it is regarded as a chattel interest, and is governed and descendible in the same manner." 2 Kent Com. 342; Co. Litt. 46 *a*. In *Gay's case*, 5 Mass. 419, it was held that an administrator may sell land holden by his intestate under a lease for nine hundred and ninety-nine years as personal property, without obtaining a license from the court, as in the case of selling real estate for the payment of debts. In *Brewster vs. Hill*, 1 N. H. 350, it was held that a term for nine hundred and eighty-five years would pass by a will under the expression "personal estate."

At common law the husband could dispose of a chattel real during his life, and it might be taken on execution for his debts, but if undisposed of during his life it went to the wife if she survived him, but if he survived her it became his absolute property. 2 Kent Com. 134; 1 Swift Digest, 24. But the common law in this respect no longer applies. The interest of the wife being personal property in contemplation of law, the husband's rights in respect to it are to be determined and limited by the act passed in 1849, which provides that "all the personal property of any married woman, married since the 22d day of June, 1849, and all the personal property thereafter acquired by a married woman, and the avails of any such property if sold, shall vest in the husband in trust for the following uses: To receive and enjoy the income thereof during his life, subject to the duty of expending from such income so much as may be necessary for the support of his wife during her life and of her children during their minority; and to apply any part of the principal thereof, which may be necessary, for the support of the wife, or otherwise with her written assent; and upon his decease the remainder of such trust property shall be transferred to the wife, if living, otherwise as the wife may by will have directed, or in default of such will, to those entitled by law to succeed to her intestate estate." Gen. Stat. Rev. of 1875, p. 186, § 3. Now if we concede, for the purpose of argument, that a leasehold estate may be subject to a mechanic's lien against the owner, or that such an interest as the husband had in it at common law might be so subject, yet in a case like the present, where the above statute applies, it is clear that a mechanic's lien cannot attach to the husband's in-

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terest, because it is utterly inconsistent with the trust to which the property is irrevocably devoted by the statute. H. E.

Fellow-Servant. — Negligence. — Loading Lumber.

In September, the Supreme Court of Wisconsin, in *Hart vs. Peters*, decided that a foreman or superintendent in a lumber-yard is a fellow-servant of a workman therein, for whose negligence the employer was not liable in damages for a resulting injury. In this case the workman was directed by a yard foreman to count the number of pieces of a certain length piled on a car which he, the workman, had just assisted in loading, and while engaged in making the count, the foreman negligently caused the car to be moved, thereby jarring one of the piles of lumber so that it fell on the workman, and injured him severely. H. E.

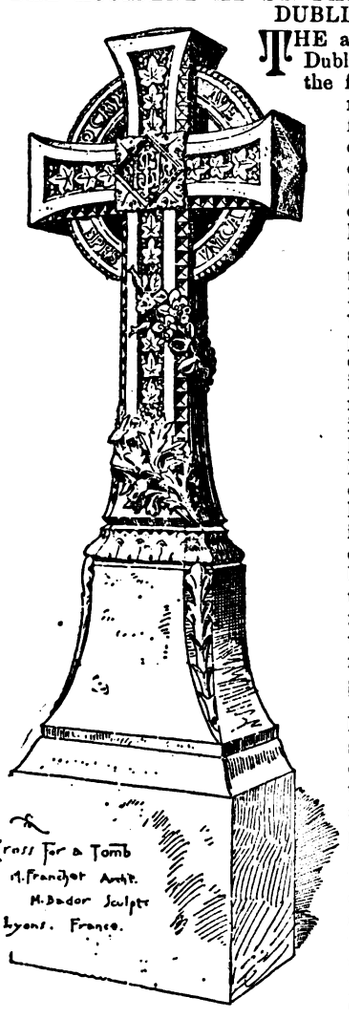
Mechanic's Lien. — Waiver. — Mutual Accounts. — Repairs. — Other Items.

1. The right to a mechanic's lien for labor or materials furnished for the erection or repair of a building may be waived by an agreement either expressed or implied. 2. Where no contract is shown except such as is implied from the running of mutual accounts between the parties for many years, with semi-annual settlements, a mechanic's lien cannot be asserted on such accounts, the items of which generally were furnished for current repairs upon machinery attached to a rolling mill. Other items, however, did not relate to repairs of the machinery or building. H. E.

Chattel Mortgage. — On Household Furniture.

A mortgage of furniture in a dwelling-house which is made to include also furniture afterwards to be purchased, will cover only the furniture of which the mortgageor was the owner when he made the mortgage. *Griffith vs. Douglass*, Supreme Judicial of Maine, May 31, 1882. H. E.

THE ACCIDENT AT ST. PATRICK'S CATHEDRAL, DUBLIN.



THE accident which happened in Dublin a few days ago, through the fall of a buttress of St. Patrick's Cathedral, calls for a few remarks, although some of the circumstances of the case have yet to be explained. St. Patrick's is one of the two cathedrals possessed by Dublin, and which have been restored at the cost of manufacturers of intoxicating drink. It is a large Gothic structure, with a high steeple that is comparatively modern, and in the opinion of many of the inhabitants of Dublin is the most remarkable part of the building. Swift was dean of St. Patrick's in the early part of last century, or, to use his own words, was "absolute lord of the greatest cathedral in the kingdom." The cathedral revenues were husbanded by Swift, but in later times they were barely sufficient to meet the expenses. There were no funds available for repairs, and the building was gradually falling into ruin. When the late Dean Pakenham was appointed he resolved to appropriate a part of his income to pay for works, and for several years a few men were to be seen pottering about the cathedral. The way in which the repairs were carried on would gladden the hearts of the opponents of restoration. There was no system, for no architect was allowed to prepare a plan dealing with the cathedral as a whole. The patching of the building was in fact one of those desirable jobs which builders are eager to secure, as they allow of the utilization of spare days. Under such circumstances it would be vain to expect that substantial work was to be executed. Dean Pakenham appeared to be the only man who had an interest in the condition of the building, and it was not difficult to satisfy him. The workmen understood the state of affairs, and they might be trusted to make light of their responsibility. After a time Mr. Guinness, a wealthy brewer, offered to take charge of the restoration of St. Patrick's, and the Dean was glad to hand over the cathedral to him to be operated on. A wholesale restoration was at once undertaken, the extent of it being left to the discretion of Mr. Guinness's builder. The sum expended was so large as to be without precedent in Ireland, or even in England; but, inasmuch as there were no architects' fees, everybody concerned was no doubt satisfied. It would be strange if the fortunate contractor were otherwise.

The Cathedral of St. Patrick's thus became not only an illustration of the munificence of a citizen of Dublin, but a striking example of the success of the policy of dispensing with an architect. It might long have continued to be distinguished on those accounts but for the catastrophe of last week, the origin of which may now be described. The site of the building is at a low level; near it runs a dirty stream called the Poddle, and which is a sort of Fleet Ditch. The lower part of the cathedral was of late years periodically flooded, and at length the authorities were compelled to undertake works for the drainage and security of the foundations. The works consisted of the underpinning of the walls and buttresses, the laying down of a tile floor, and the construction of an engine-house in connection with the hot-water apparatus. The old precedents appear to have been disregarded, for the works were under the superintendence of an architect.

The underpinning of the buttresses was commenced last week. A trench was opened near the north wall, and was excavated a few feet under the foundations. The first buttress that was underpinned is the one which collapsed, killing in its fall a woman and two boys. It was about 70′ high, 4′ wide, and projected 7 feet from the body of the church. As the underpinning was supposed to be simple and likely to be completed in a short time, it was not supposed that any shoring of the buttress was necessary. The foreman mason in describing what was done, said to the coroner and jury that "he took a foot and a half down, a foot and a half at the right, and a foot and a half at the left, and that he pinned up each portion of it before he commenced another." It is possible that the material beneath the buttress was barely sufficient to carry a mass of masonry of which the weight has been calculated to be more than 90 tons, but when a part of the foundation was removed the remainder was overweighted. The remarkable part of the case is that the whole weight came upon the foundation. The buttress was, in fact, stuck on the wall without being tailed in or tied throughout its entire length, and consequently there was nothing to take the load off the ground. It is easy to imagine what followed. A space between the buttress and the wall became evident, but it is needless to say the foreman did not apprehend danger, and nothing was done to prevent an accident. In the middle of the day the buttress fell suddenly in a mass which was not broken until the railings and ground were struck. The street adjoining the cathedral is rather wide, otherwise there would have been damage to some of the houses.

The buttress, which was constructed in so peculiar a way, would seem to be the work of the builder who was employed in 1845 by Dean Pakenham. It is precisely the kind of make-believe that might be expected when work is allowed to be carried on without the superintendence of an architect, and a scrutiny of the building would probably reveal many other examples of defective masonry. The main cause of the accident consequently does not arise from negligence on the part of those who now have charge of the cathedral. It might have been possible to preserve the buttress if the architect and builder were aware that the buttress was practically detached from the wall, but it was not unreasonable to assume that a compact mass of masonry could stand for a few hours if partially supported. — *The Architect.*

AMERICAN SOCIETY OF CIVIL ENGINEERS.

THE Society met Wednesday, October 18, 1882, at 8 P. M., Vice-President Wm. H. Paine in the chair, John Bogart, Secretary.

The death of Henrique Harris, M. Am. Soc. C. E., on October 10, was announced, and the preparation of a memoir was directed.

A paper by Henry D. Blunden, M. Am. Soc. C. E., on the "Care and Maintenance of Iron Bridges," was read by the Secretary. The writer observed that while many papers and much discussion had been published on the design and construction of bridges, there had been little or nothing on the subject of their care and maintenance after erection. Indeed there seems a prevalent idea that, once erected, they will last forever with no care but an occasional coat of paint, and even that is often not attended to. A close examination during nine years past of a large number of bridges shows constant, shameful neglect. The fact is that the immediate care of bridges is generally left to men who know nothing either practically or theoretically of their design or manufacture. The single idea is to screw everything up tight and, to replace all rivets without asking why a rivet drops out several times in the same place. The paper enumerated various causes of undue wear in bridges — uneven bearing of rails and ties; insufficient freedom of expansion-gear, often caused by accumulation of dirt; improper anchoring of fixed ends; poor masonry; uneven adjustment of laterals; uneven bearing of suspended floors; over-tightening of counters; corrosion of iron; false economy in construction of floors, rendering renewals very expensive; too large joints between ends of rails.

The writer also gave a number of suggestions as to the proper care of bridges, particularly insisting upon constant inspection, and frequent reports to the office of the Chief Engineer.

The paper was discussed by Messrs. C. Macdonald, S. H. Shreve,

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Theo. Cooper, Wm. H. Paine, J. P. Davis, W. E. Worthen, J. G. Sanderson, C. E. Emery and J. C. Campbell. In the discussion the great necessity of attention to the care of bridges in use was forcibly brought out. Instances were mentioned of the serious results of entrusting this duty to incompetent men, and of the advantage found by the few corporations now taking proper measures. Reference was made to the great difficulty of adjustment in bridges with parts in cast and parts in wrought iron. A case was described in which an iron rod in contact with sulphur became seriously corroded. It was stated that the ordinary commercial sulphur had an amount of sulphuric acid sufficient to cause rust, but that when properly washed it was safe. The use of sulphur or lead for joints was discussed. An ordinary misapprehension as to scale was illustrated by an instance when the actual amount of iron in the scale was found to be but one-tenth of the scale. The use of lime whitewash to protect iron was considered and instances of its good effect were mentioned.

A PAPER ON WATER-CLOSETS.

Washington, D. C., October 23, 1882.

To the Editors of the American Architect:—

Sirs,—The copy of the final programme issued by the Committee of Arrangements for the Sixteenth Annual Convention of the American Institute of Architects, to be held in Cincinnati this week which I enclose herewith, was sent to me by the Secretary of said Association, Mr. A. J. Bloor. By comparing this programme with the account which appears in your last issue, you will see that although my name is down in said programme for a paper on "Water-Closets," to be read the second day of that convention, no mention whatever is made of this fact in the account published by you. Presuming that you desire your statement in this particular to be accurate, and believing that you have no intention to do me an injustice, I deem it right and proper, both as an old subscriber to your paper and a member of the said Institute, to call your attention to the error in the account of the proceedings published by you, and to request correction thereof. Yours, etc., Glenn Brown.

BOOKS ON PERSPECTIVE.

Chicago, October 21, 1882.

To the Editors of the American Architect:—

Sirs,—Will you oblige me by mentioning the titles of any books on perspective giving particularly the Brook Taylor method which puts the *plan* in perspective; also, any modern books on the subject giving the use of the centrolinead and the curvilinear method, and where the books mentioned can be obtained, and much oblige

An Old Subscriber.

Winona, Minn., October 20, 1882.

To the Editors of the American Architect:—

Dear Sirs,—Will you be kind enough to give me information with regard to the best book on perspective drawing, and where I may obtain such a work?

Yours respectfully, Austin W. Lord,
With Maybury & Son.

[Messrs. James R. Osgood & Company will shortly publish what they confidently expect to be the most thorough and scientific work on architectural and other perspective drawing in the English language, the work of Professor William R. Ware, of Columbia College School of Mines. The book will fully explain curvilinear perspective and the method of putting plans into perspective, referred to by "Old Subscriber," but whether the use of the centrolinead is explained we are not informed.—Eds. American Architect.]

NOTES AND CLIPPINGS.

An Anti-Restoration Society in Miniature.—It was recently announced in England that Father Ignatius was collecting subscriptions for a restoration of Llanthony Abbey. This abbey belongs to the Landor family, and at present is in the possession of Walter Savage Landor, the son of the great Walter Savage Landor, and the heir and lord of the manor. Mr. Landor writes to a London newspaper protesting against money being raised on any pretense of restoring this edifice, and warning Ignatius not to trespass on or meddle with his property. "I have given orders," he says, somewhat after his father's manner, "to my agent not to allow any monks to skulk about the property." He hopes his announcement will put a stop to subscriptions which cannot restore Llanthony Abbey. It was in relation to the holding of services in this abbey that his father wrote the famous second letter to the Bishop of the diocese, in which he declared: "God alone is great enough for me to ask anything of twice."—*New York Times.*

Expansion and Contraction of Iron and Steel.—Some of the anomalies presented in the expansion and contraction of iron wire, as observed by Professor Norris, have led him to the conclusion that in steel and iron containing free carbon there is a contraction or shortening which is excited by heat, and which proceeds simultaneously with the dynamical expansion and marks its true amount; this is divisible into high and low temperature contraction. In cooling a strained iron wire from redness, it was found that the contraction due to cooling was, at a certain point and for a limited period, changed into action of elongation; in good iron wire this irregularity could not be detected, but in hard wire and steel was very apparent. The wire has to be raised to a very high temperature before the temporary elongation during cooling can be seen, and it does not take place if the wire is heated only just beyond the temperature at which it occurs.—*National Scientific American.*

Proposed Tests for Materials used in Drainage Construction.—The *Deutsche Bauzeitung*, of Berlin, has lately called attention to the importance of special tests for the materials used in drainage constructions, in view of the increasing adoption of the modern system of sewerage in the various cities of Germany. It is remarked that the tests used in connection with the construction of open water-courses are of no practical value when applied to drain-pipes, even when materials of an analogous nature are employed. This arises from the nature of the liquids carried through sewer-pipes, which contain, in most cases (although in a very diluted form), a certain percentage of alkalies and of different acids—the latter being found in greater abundance in the sewage of industrial towns. Thus it is suggested that the tests of the materials used in constructing drains should be conducted with a view to determine their properties of resistance to muriatic, sulphuric, and nitric acids. Some time ago Dr. Kämmerer, of Nuremberg, instituted a series of tests of this description, with special reference to the drainage works of that city. Pieces of the various substances to be tested were left for a certain length of time in a solution of one per cent of sulphuric, muriatic, and nitric acid, or ammonia, and their loss in weight was accurately observed. The results arrived at showed that ammonia exercises an effect of such slight importance that its action can, as a rule, be disregarded. The destructive properties of muriatic and sulphuric acid were, however, fully demonstrated. In the various kinds of brick the loss was from .02 to 23.50 per cent. The losses in the instances of concrete and cement pipes varied from 13.94 to 37.11 per cent. Glazed pottery-ware pipes withstood the influence of the acids better than any of the other kinds tested, their loss only being from 0.13 to 0.17 per cent. These tests, which were made in 1878, were noticed at the time in various technical journals, and although they led to the prohibition of the pouring of the refuse water from chemical factories into the sewers of Nuremberg (mostly built of cement-concrete), they have not been regarded to any appreciable extent in the smaller towns in Germany. Cement-concrete and cement pipes do not, however, seem to be used in the more important drainage operations in the principal German capitals. In connection with the destructive influences of certain acids upon substances containing lime, silicate of lime, and more particularly carbonate of lime, it is remarked that mechanical causes also act in an injurious manner. When the lower part of the drain is attacked in such a way that a cavity is formed, solid matters sink into it, and in smaller drains a stoppage may after a time result. The expenses of excavation and other labor bear such a heavy proportion to the total cost of drainage operations, that a slight difference in the outlay for the materials used does not seriously affect the entire expenditure. Works of this description occasion such disturbances of traffic, and are of such vital importance to the public health, that it is with justice remarked that only such materials should be used as promise the longest period of service without need of repair. Thus any partiality to local industry may lead to the most troublesome results in the end.—*The Building World.*

The Most Visionary of Schemes.—A Rochester gentleman, said by the *Democrat* to be "of liberal education and pleasant address," has devised a scheme as astonishing as Keely's, Henkle's, or any of the other don't-stop-at-trifles inventors of the day. The idea of this gentleman is to furnish power to run the whole world, so to speak, but more particularly the ocean steamers and ships of all kinds, railroad trains, factories, etc. Like the other inventors, he proposes to get his power very cheap—in fact, for nothing. His idea is to construct a turbine wheel, nearly one mile in diameter, with all the modern improvements. This wheel he intends to have placed in the great maelstrom off the coast of Norway, attaching to it cables which shall span the oceans, and which, when the wheel once starts in motion, as it is of course sure to do in this wonderful current, will furnish power for everybody. All the expenses attached to this will be repairs to the wheel and the cables which may occur from time to time, "and," said the inventor to a *Democrat* reporter, "you know that will amount to almost nothing." The projector of this extraordinary enterprise wishes his name withheld for the present, or until he has his plans and drawings nearer perfection, when he promises that they shall be accessible to everybody for inspection. He proposes to form a stock company to be known as the National Cable Towing Company, and will probably find no difficulty in getting subscribers to pay the expenses of his puttering over his visionary scheme.—*Chicago Tribune.*

A bas, Bismarck.—Prince Bismarck's traditional three single hairs as the sole ornaments of his massive head have long been a favorite subject of caricature with the Berlin comic journals, but the Chancellor may now recognize this characteristic of his appearance depicted in stone over several windows in Potsdam. The owner of these houses, according to the *American Register*, is a rich capitalist who has worked his way up from a simple mason, with only one disaster in his life—the loss of his only son in the Franco-Prussian War. He regards Prince Bismarck as the author of the war, and therefore as his son's murderer, and so adopts a somewhat singular method of revenging himself upon his enemy. Over the grave of his son in the Potsdam cemetery he has erected a splendid mausoleum, surmounted by an owl with the face of Prince Bismarck, three hairs and all. On one of his houses the Bismarck head looks over the cornice of each window, with the three hairs represented by small cannon. On another building, similarly adorned, three serpents take the place of the hairs; while a third house is now being built, and the capitalist's neighbors are eager to see what fresh flattering ornament will be bestowed on the Prince's head.—*London Graphic.*

Icelandic Ruins.—Further ruins, believed to have been the foundations of Icelandic settlements, have been discovered in Greenland, and on the east coast in latitude 60° 31′. A building was found forty paces long by ten broad, in which were stones large enough to warrant the title of Cyclopean. Similar ruins are reported by the natives at other points on the coast.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

265,940. MANUFACTURE OF SAND-PAPER. — Chas. Baeder, Jenkintown, Pa.

265,951. FASTENER FOR MEETING-RAILS OF SASHES. — Jacob K. Foss, Reading, Mass.

265,974. SAFETY ATTACHMENT FOR ELEVATORS. — Dennis Frisbie, Philadelphia, Pa.

265,981. EAVES-TROUGH HANGER. — Charles L. Pierpont, Red Wing, Minn.

265,998. REAMER. — George R. Valentine, New Bedford, Mass.

266,010. BRICK FOR BUILDING ARCHES AND FURNACE ROOFS. — William G. Bell, Allegheny City, Pa.

266,015. SKYLIGHT AND VENTILATOR. — William Conolly, New York, N. Y.

266,033. KNOB AND ROSETTE ATTACHMENT. — Francis J. Harper, Norwich, Conn.

266,045. CLAW-HAMMER. — Henry D. Morris, San Francisco, Cal.

266,062. FIRE-ESCAPE. — Chas. F. Spencer, Rochester, N. Y.

266,075. LIGHTNING-ROD JOINT OR COUPLING. — Charles E. Ball, Philadelphia, Pa.

266,092. PRESERVATION OF WOOD. — Rudolph G. Bürstenbinder, Hamburg, Germany.

266,099. DRAWING-TABLE. — Edwin C. Cleaves, Cortland, N. Y.

266,107. ELECTRIC SAFETY DEVICE FOR ELEVATORS. — Robert M. Curtiss, Brooklyn, N. Y.

266,108. HYDRAULIC ELEVATOR. — Chas. G. Curtis and Schuyler S. Wheeler, New York, N. Y.

266,142. AUTOMATIC FIRE-EXTINGUISHER. — Ozro C. Heath, Providence, R. I.

266,156. MORTISING-MACHINE. — Levi Houston, Montgomery, Pa.

266,170. LOCKING-LATCH. — Jos. Loch, New York, N. Y.

266,183. FIRE-ESCAPE. — Elbridge J. Moore, New York, N. Y.

266,196. COMPOSITION FOR ROOFING. — David H. Priest, Everett, Mass.

266,208. TRAP AND OVERFLOW STOP FOR WASH-BASINS, ETC. — William D. Schuyler, New York, N. Y.

266,213. DOMESTIC GRATE OR FIREPLACE. — Chas. William Siemens, Westminster, County of Middlesex, England.

266,216. WATER-CLOSET CISTERN. — Samuel F. Sniffen, New York, N. Y.

266,252. BURGLAR-ALARM. — Marcellus Decker and James K. Deming, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report thirty-one permits have been granted, the more important of which are the following: —

Graswick & Horshman, 3 two-st'y brick buildings, s w cor. Alice-Anne and Durham Sts.

G. W. M. Crook, two-st'y brick stable, in rear of 287 Madison Ave., between Hoffman & Dolphin Sts.

John B. Biemuller, two-st'y brick stable, e s Burgundy Alley, between Stockholm and Ostend Sts.

Protestant Episcopal Church of the Atonement, brick and stone church, Chester St., between John and Biddle Sts.

Jenkins & Gilbert, two-st'y brick building, 25' x 50', s w cor. Ridgely and West Sts.

A. C. Meyers, 2 six-st'y and basement warehouses, 27' x 80' each, n s Lombard St., e of Sharp St.

Central Passenger Railway Co., two st'y brick building, s e cor. Preston and Constitution Sts.

B. Haurahan, 3 three-st'y brick buildings, e s Cary St., n of Lanvale St.

E. F. Baldwin, 4 three-st'y brick buildings, e s Cary St., between Lanvale and Townsend Sts.

Gotlieb Menken, two-st'y brick building, w s Haubert St., s of Nicholson St.

Anton Koerber, two-st'y brick building, w s Haubert St., s of Nicholson St.

A. R. Shipley, two-st'y brick building, cor. Gilmor and Calhoun Sts.

Thomas H. Paul, one-st'y brick machine-shop, 50' x 150', s s Ohio Ave., w of Byrd St., and one-st'y brick machine-shop, 40' x 130', in the rear.

All Saints' Church, chapel, in rear of s e cor. Monroe and Baltimore Sts.

Wm. Wurtzburger, 2 three-st'y brick buildings, w s Light St., n of Fort Ave.

Boston.

BUILDING PERMITS. — Owing to the removal of the office of Inspector of Building from City-Hall to the old State-House, the building permits have not been written up for the past few days. The following two are the only ones of importance: —

Wood. — Murdock St., rear, near Sparhawk St., Ward 25, for Mrs. F. B. Sears, stable, 20' x 24'; S. M. Davenport, builder.

Walnut Park, rear, near Walnut Ave., Ward 21, for Wm. D. Cotton, stable, 40' x 50'.

Brooklyn.

BUILDING PERMITS. — *Eleventh St.*, s s, 125' e Fifth Ave., two-st'y brick dwell., tin roof; cost, $6,000; owner, W. A. Bliss, 292 Eighteenth St.; architect, R. B. Eastman; builders, John Shorrick and J. B. Jacobs.

Ellery St., Nos. 174, 176 *and* 178, s s, 44' w Delmonico Pl., 3 three st'y frame tenements, tin roof; cost, total, $10,000; owner, Adam Schauf, Flushing Ave., cor. Whipple St.; architect, Th. Engelhardt; builders, Wolf & Hofgesang and Jno. Rueger.

Herkimer St., 250' w Ralph Ave., three-st'y frame dwell., tin roof; cost, $5,000; owner, Rev. Ignatius Zeller, 931 Herkimer St.; architect, J. Platte; builder, F. J. Berlenbach.

Suydam St., n s, 200' w Bushwick Ave., three-st'y frame dwell., tin roof, cost, $5,400; owner, Wm. Schildknecht, 33 Moore St.; architect, J. Platte; builders, W. Dafeldecker and C. Weiber.

Pierrepont St., No. 44, between Hicks and Henry Sts., four-st'y brick and stone dwell., slate and metal roof; cost, $20,000; owner, Franklin E. Taylor; architects, Parfitt Bros.

Concord St., s s, about 80' w Washington St., four-st'y brick home, tin roof; cost, $15,000; owners, Trustees Home for Friendless Women and Children; architects, Parfitt Bros.; builders, O. Nolan and Morris & Selover.

Hewes St., s s, 300' e Marcy Ave., 4 three-st'y brownstone dwells., tin roofs; cost, each, $7,000; owner, James Sheridan; architect, E. F. Gaylor.

Central Ave., e s, 50' s Myrtle St., 2 three-st'y frame tenements, tin roofs; cost, total, $8,000; owner, A. Sedlmeyer, Myrtle St., cor. Central Ave.; architect, Geo. Hillenbrand.

Linden St., n s, 200' e Broadway, 4 two-st'y brownstone dwells., tin roof; cost, each, $4,500; owner, S. M. Meeker, Bushwick Ave., cor. Linden St.; architect, E. F. Gaylor; builders, John McQuade and Jenkins & Gillies.

Elizabeth St., n s, 100' e Richards St., three-st'y brick factory, tin roof; cost, $3,500; owner, J. A. Knowles, 495 Clinton St.; architect, J. N. Stanley; builders, P. Carlin & Sons and C. M. White.

Dean St., No. 159, three-st'y brick hospital, slate and metal roof; cost, $8,000; owner, the Sheltering Arms Nursery Assoc.; architects, Parfitt Bros.; builder, T. W. Rollins.

Greene Ave., n e cor. Knickerbocker Ave., 5 two-st'y frame dwells., tin roof; cost, $7,000; owner and architect, James C. Bower; builders, Cardwell & Hawkins.

Vernon Ave., n s, 250' w Marcy Ave., 4 two-and-a-half-st'y frame dwells., tin roof; cost, each, $4,000; owner and architect, Thomas E. Greenland, 256 Kosciusko St.; architect, I. D. Reynolds.

Ninth St., s s, 177' 6" w Eighth Ave., 4 three-st'y brownstone dwells., tin roof; cost, each, $7,000; owner, architect and builder, E. L. Pierson, Ninth St., between Seventh and Eighth Aves.

McDonough St., n s, *and Macon St.*, s s, 125' w Reid Ave., 6 two-st'y brownstone dwells., tin or gravel roof; cost, each, $4,500; owner, Henry A. Foster, 155 East One Hundred and Third St., New York; architect, J. E. Styles.

Ninth St., s s, between Seventh and Eighth Aves., 12 three-st'y brick dwells., tin roof; cost, $8,000 each; owner, etc., E. L. Pierson, Ninth St., between Seventh and Eighth Aves.

Vanderbilt Ave., w s, near Park Ave., three-st'y brick dwell., tin roof; cost, $6,500; owner, Jacob Gouenes; carpenters, Long & Barnes.

Chicago.

BUILDING PERMITS. — H. C. Durand, six-st'y and basement brick warehouse, 50' x 81', Jackson St., near Market St.; cost, $20,000.

John Wegfroth, two-st'y and basement brick store and dwell., 24' x 56', No. 632 West Twelfth St.; cost, $2,800.

Mrs. H. O'Connell, two-st'y and basement brick dwell., 21' x 50', Loomis St., near Taylor St.; cost, $3,500.

W. Kosse, two st'y and basement brick store and dwell., 22' x 58', 789 West Twelfth St.; cost, $4,000.

James Mouatt, two-st'y and basement brick dwell., 32' x 54', 767 West Van Buren St.; cost, $3,000.

A. Cummings, two-st'y brick dwell., 22' x 50', 213 McGregor St.; cost, $3,000.

J. D. McAuley, 4 two-st'y and basement brick dwells., 66' x 84', 3305 Calumet Ave,; cost, $20,000.

C. W. Munger, 2 three-st'y and basement brick stores and dwells., 50' x 85', 518 and 520 West Madison St.; cost, $12,000.

C. Goodman, two-st'y brick dwell., 22' x 50', 243 Ramsey St.; cost, $3,500.

Andres & Fitch, 2 two-st'y brick flats, 47' x 65', 3022-3024 Indiana Ave.; cost, $11,000.

S. P. Parmly, 2 three-st'y and basement brick stores and flats, 50' x 63', 302 and 304 Douglass Ave.; cost, $20,000.

J. J. Luther, two-st'y and basement brick dwell., 20' x 57', 400 North State St.; cost, $5,000.

J. W. Hobson, two-st'y and basement brick dwell., 25' x 50', 402 North State St.; cost, $5,000.

A. B. Lawther, two-st'y and basement brick machine-shop, 50' x 75', 118-120 North Market St.; cost, $9,000.

Fred. O. Ernest, two-st'y and basement brick dwell., 22' x 40', 1028 North Halsted St.; cost, $4,500.

James P. Dwyer, three-st'y and basement brick dwell., 30' x 70', 180 Cass Ave.; cost, $12,000.

Burdett & Smith, three-st'y brick warehouse, 114' x 164', Johnson St., cor. Sixteenth St.; cost, $20,000.

E. E. Swiney, two-st'y and basement brick dwell., 24' x 48', McAllister St., near Loomis St.; cost, $5,000.

John W. Stewart, 4 three-st'y and basement brick stores and dwells., Cottage Grove Ave., cor. Prospect Pl.; cost, $20,000.

John Hoffman, three-st'y brick dwell., 28' x 70', 3637 Ellis Park; cost, $12,000.

Sophia Fahlbush, three-st'y brick store and dwell., 2956 South State St.; cost, $8,000.

Call & Johnson, 3 three-st'y and basement brick stores and dwells., 48' x 80', Nos. 1311 and 1313 State St.; cost, $14,000.

Henry Van Buren, two-st'y and basement brick dwell., 22' x 36', 1364 West Washington St.; cost, $4,000.

H. McRae, two-st'y brick dwell., 21' x 46', Roby St., near Polk St.; cost, $2,500.

Jacob Greenebaum, two-st'y brick store and dwell., 24' x 60', 619 West Madison St.; cost, $3,800.

John Borden, 2 four-st'y and basement brick stores, 80' x 105', 208 to 214 Randolph St.; cost, $50,000.

Bullock Manufacturing Co., two-st'y brick factory, 60' x 167', Tallman St., near Lake St.; cost, $20,000.

L. H. Evans and W. M. Adams, 2 three-st'y brick dwells., 37' x 44', 554 and 566 West Washington St.; cost, $10,000.

John Germok, two-st'y and basement brick store and dwell., 602 Throop St.; cost, $2,500.

Cincinnati.

STORES.—Mr. Nathaniel Ropes is to build on Main St., near Court St., a four-st'y pressed brick front to be used as stores on the ground floor and apartments above. The building is 45' x 100', and will cost about $35,000; Mr. James W. McLaughlin is the architect.

BUILDING PERMITS. — Michael M. McKiernan, 3 two-st'y buildings, Fulton Ave.; cost, $4,000.

Louis L. Dankel, two-st'y building, Hammond St., bet. Eden and Vine Sts.; cost, $3,000.

Repairs, $41,000.

New York.

BUILDING PERMITS. — *Baxter St., Nos.* 114 *and* 116, fronting on Canal St., at rear, six-st'y brick and brownstone warehouse, tin roof; cost, $39,000; owner, Martin Schrenkeisen, 809 East Seventeenth St.; architect, H. Fernbach; builders, Van Dolsen & Arnott.

Frankfort St., Nos. 32 *and* 34, six-st'y brick warehouse, tin roof; cost, $10,000; owner, M. Giblin, care of the architect, T. R. Jackson, 61 Broadway.

Grand St, *No.* 387, three-st'y brick store and tenement, tin roof; cost, $7,000; owners, Adolf and Emanuel Alexander, on premises; architect, J. Boekell.

Thirteenth Ave., from Bethune St. to Twelfth St., 4 five-st'y brick warehouses, gravel roof; cost, each, $31,000; owner, John T. Johnston, 8 Fifth Ave.; architect, Jas. Renwick; builder, Thomas Stone.

East Seventeenth St., No. 512, five-st'y brick tenement, tin roof; cost, $7,000; owner, Joseph M. Ohmeis, 114 East Seventh St.; architect, Wm. Graul.

East Seventeenth St., No. 514, five-st'y brick tenement, tin roof; cost, $9,000; owner and architect, same as last.

West Twenty-first St., No. 529, between Tenth and Eleventh Aves., three-st'y frame lumber-shed, tin roof; lessee, Chas. Hofferberth, on premises; builders, Fessler & Wolfart.

East Seventeenth St., Nos. 512 *and* 514, rear, one-st'y brick stable, gravel roof; cost, $3,000; owner, Joseph Ohmeis, 114 Seventh St.; architect, Wm. Graul.

East Thirty-fourth St., No. 415, four-st'y brick store and tenement, tin roof; cost, $12,000; owner, Ann H. Marshall, 413 East Thirty-fourth St.; architect, Andrew Spence; builder, Joseph Marshall.

Thirty-ninth St., s s, 65' e Twelfth Ave., one-st'y brick factory, gravel roof; cost, $4,500; owner, Jas. McClenahan, 531 West Thirty-ninth St.; architects, Thom & Wilson.

West Forty-fifth St., Nos. 423, 425, 427, 429 *and* 431, between Ninth and Tenth Aves., 5 five-st'y brick tenements, tin roof; cost, each, $1,000; owner, Margaret E. Niebuhr, 131 East One Hundred and Twelfth St.; architect, W. Scott West; builders, Niebuhr Bros.

Forty-eighth St., No. 431, between Ninth and Tenth Aves., four-st'y brick tenement; tin roof; cost, $11,000; owners, architects and carpenters, Findley & Gardner, 427 and 429 West Forty-eighth St.; mason, J. T. Stevenson.

Sixty-ninth St., n s, 100' e Third Ave., 5 four-st'y brick and brownstone flats, tin roof; cost, each, $20,000; owner, Andrew Kelly, 404 East Eighty-second St.; architect, G. A. Schellenger.

Ave. A, w s, from Seventy-ninth St. to Eightieth St., 8 four-st'y brownstone stores and tenements, tin roof; cost, each, $13,000; owner, Michael Duffy, 156 East One Hundred and Second St.; architect, Andrew Spence.

Seventy-ninth St., n s, *and Eightieth St.*, s s, between Ave. A and First Ave., 24 four-st'y Connecticut brownstone tenements, tin roof; cost, each, $12,500; owner, Michael Duffy, 156 East One Hundred and Second St.; architect, A. Spence.

Seventy-third St., s s, 350' e Tenth Ave., 5 four-st'y brick and brownstone dwells., tin roof; cost, each, $35,000; owner, Margaret Crawford, 956 Third Ave.; architect, G. A. Schellenger.

Sixth Ave., e s, 25' s One Hundred and Twenty-fourth St., one-st'y wood and glass front dwell.; cost, $4,000; owner, John R. Kelly, Sixth Ave., s e cor. Twelfth St.; architect, M. L. Ungrich.

One Hundred and Twenty-fifth St., s s, 200' e Eighth Ave., 2 five-st'y brick and freestone tenements, tin roof; cost, each, $12,000; owner, Sarah Darragh, 23 West One Hundred and Twenty-third St.; architect, Jno. E. Darragh; builder, Theo. Darragh.

One Hundred and Twenty-seventh St., n s, 85' w Seventh Ave., 2 three-st'y brownstone dwells., tin roof; cost, each, $14,000; owner, Samuel H. Bailey, 186 East One Hundred and Fourth St.; architect, F. T. Camp.

One Hundred and Thirtieth St., n s, 250' w Eleventh Ave., four-st'y brick tenement, tin roof; cost, $11,000; owner, Charles Bornkamp, 170 Robbins Ave.; architect, James Barrett.

One Hundred and Fortieth St., n s, 325' w Grand Boulevard, two-st'y brick stable, tin roof; cost, $4,000; owner, Henry L. Hoguet, 48 West Twenty-eighth St.; architect, W. H. Hume; builders, Isaac A. Hopper and C. E. Hume & Co.

One Hundred and Forty-first St., n s, 100' e Eighth Ave., two-st'y frame dwell., tin roof; cost, $4,000; owner, John Barthel, One Hundred and Forty-first St., w of Eighth Ave.; architect, Wm. Kusche.

One Hundred and Thirty-fourth St., s s, 100' e Lincoln Ave., one-st'y brick factory, gravel roof; cost, $15,000; owner, New York Wood Turning Co., 16 Cortlandt St.; architects, Smith & Howe; builders, J. V. Donovan and W. L. DeGraw.

Tinton Ave., w s, 50' n One Hundred and Forty-fifth St., 4 two-st'y frame dwells., tin roof; cost, each, $4,500; owners, J. & M. Haffen, One Hundred

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and Fifty-second St., near Courtlandt Ave.; architect, A. Pfeiffer.

Alterations. — *Broadway, No. 471, and Mercer St., No. 44*, repair damage by fire; cost, $3,547; owner, Jane A. Gibson, 256 Lexington Ave.; builder, E. Smith.

Water St., Nos. 265 and 267, repair damage by fire; cost, about $5,000; owner, Wm. E. Treadwell, 172 West Eleventh St.; architect, Chas. Mettam.

East Third St., No. 306, three-st'y brick extension, tin roof, interior alterations, etc.; cost, $3,000; owner, Catharine A. Smart, 300 Delancey St.; builders, J. Hamel & Son.

Philadelphia.

House. — House for Barton Miller, Esq., to be of brick and brownstone; cost, $32,000; located on Walnut St., below Forty-second St.; Geo. Hewitt, architect.

Building Permits. — *Mary St., No. 4025*, two-st'y dwell., 18' x 31'; Jno. Anderson, owner.

Mould St., e s, n of Wharton St., 7 two-st'y dwells., 15' x 40'; Alex. Beck, owner.

Grayson St., No. 1732, three-st'y dwell., 14' x 40'; Jas. F. Scott, owner.

Garden St., No. 429, two-st'y shop, 14' x 50'; S. W. Moore, contractor.

Scott St., s s, between Ninth and Tenth Sts., 4 two-st'y dwells., 16' x 24'; Jas. McCall, contractor.

Reese Ave., s e cor. Lehigh Ave., three-st'y store and dwell., 20' x 48'; C. H. Keyser, contractor.

Fifth St., n e cor. Huntingdon St., three-st'y store and dwell., 21' x 70'; Chas. O'Kronlowicz, contractor.

Walnut St., Nos. 341 and 333, four-st'y office-building, 30' x 60'; Liverpool & Globe Insurance Co., owners.

Twentieth St., e s, n of Fairmount Ave., three-st'y dwell., 18' x 58'; Jos. B. Evans, owner.

Palethorp St., w s, s of Susquehanna Ave., 12 two-st'y dwells., 12' x 28'; Chas. Bossert, contractor.

Twelfth St., e s, n of Columbia Ave., three-st'y tavern and dwell., 23' x 80'; Chas. Casper, owner.

Howard St., e s, n of Lehigh Ave., four-st'y factory, 40' x 100'; Jas. McCartney, contractor.

Twenty-eighth St., e s, s of Oxford St., 2 two-st'y dwells., 18' x 42'; W. H. Lower, contractor.

Bridge St., near Walker St., four-st'y ice-house and brewery, 35' x 61'; Jas. B. Doyle, contractor.

Fifth St., s e cor. Willow St., six-st'y ice-house and brewery, 62' x 114'; Jas. B. Doyle, contractor.

Edward St., No. 113, four-st'y ice-house, 47' x 50'; Jas. B. Doyle, contractor.

Ellsworth St., n s, e of Twenty-first St., four-st'y factory, 56' x 60'; Thos. Little, contractor.

Marla St., No. 410, three-st'y dwell., 18' x 45'; Emma H. Lentz, owner.

Lafayette St., e s, between Adams and Green Sts., three-st'y dwell., 16' x 42'; Henry Harrison, contractor.

East Dauphin St., No. 829, three-st'y dwell., 18' x 32'; Jno. S. Baldt & Son.

Grape St., n s, w of Thirty-eighth St., 2 two-st'y dwells., 13' x 40'; Jas. C. Shedwick, owner.

Twenty-eighth St., cor. Albrecht St., 2 two-st'y dwells., 14' x 40'; W. F. Albrecht, owner.

Adams St., s s, between Coral and Emerald Sts., 2 two-st'y dwells., 15' x 42'; Jno. Mitchell, contractor.

Venango St., s s, cor. Frankford Road and Emerald St., 2 two-st'y dwells., 16' x 40'; D. C. Schuler, contractor.

Haines St., n s, w s Chestnut Hill R. R., 2 two-st'y dwells., 15' x 25'; Wm. Kohl & Co.

Potter St., e s, between Leamy St. and Lehigh Ave., 4 two-st'y dwells., 14' x 28'; Jos. Lutz, contractor.

Alterations and Additions. — *Fairmount Ave., No. 1417*, fourth-st'y addition to dwell., 25' x 50'; Jno. England, contractor.

Germantown Ave., cor. Nicetown Lane, third st'y addition to factory, 38' x 45'; Benj. Walker, contractor.

Buttonwood St., Nos. 927 and 929, 2 third-st'y additions to dwells., 17' x 30'; P. H. Somerset.

St. Louis.

Building Permits. — Thirty-four permits have been issued since our last report, of which sixteen are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Adam Weber, two-st'y brick dwell.; cost, $4,000; G. W. Pipe, architect; J. B. Asper, contractor.

Mrs. S. A. Wilson, two-st'y brick dwell.; cost, $3,500; J. B. Legg, architect; S. L. Jones, contractor.

B. Proetz, two-st'y brick dwell.; cost, $4,000; J. J. Rosevelt, contractor.

B. Proetz, two-st'y brick dwell.; cost, $4,000; J. J. Rosevelt, contractor.

S. B. Jones, two-st'y brick dwell.; cost, $6,000; Henry Roach, contractor.

J. H. Teasdale, two-st'y brick dwell.; cost, $10,000; Young & Johnston, architects; Henry Roach, contractor.

P. Roeder, two-st'y brick dwell.; cost, $7,500; Gas. Koch, contractor.

P. Roeder, two st'y brick dwell.; cost, $4,500; Gas. Koch, contractor.

W. J. Beattie, two-st'y brick dwell.; cost, $3,000; W. J. Beattie, contractor.

General Notes.

Alliance, O. — Frame house for Lafu Wonders; cost, $3,000; John Bartley contractor; Guy Tilden, architect.

Asbury Park, N. Y. — Mrs. L. H. Annibaldi of New York, is erecting another cottage; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Baltimore Co., Md. — All Saints Episcopal Chapel, frame, stone foundation, seating capacity, 300; cost, $3,000; C. E. Cassell, architect, Baltimore.

Academy addition; three-st'y addition to Hannah Moore Academy; cost, $5,000; C. E. Cassell, architect.

Frame addition to John Gill's house; cost, $2,000; Wyatt & Sperry, architects.

Three-st'y frame cottage for A. H. Rutherford; cost, $5,500; Wyatt & Sperry, architects.

Batchtown, Ill. — Plans have been received for the public school-house to be built here, of brick, two stories; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Bloomington, Ind. — Residence for John Waldron; cost, $5,000; C. A. Wallingford, architect, Indianapolis, Ind.

Bridgeport, Conn. — Four brick houses for E. Warren, on Broad St.; cost, $16,000; foundations now in.

P. Day, two houses, 38' x 40'; Myrtle Ave.; cost, $4,500.

A block of four brick houses is building at East Bridgeport for D. E. Marsh, at a cost of $9,000; Jas. Spargo, builder.

Palliser, Palliser & Co., are architects for all above.

The plans bearing the motto "*Palman qui meruit ferat*," and adopted by the Cleveland School Board in the competition of May last, were submitted by Palliser, Palliser & Co., of this city, who are preparing the working plans, details and specifications.

Plans are being prepared by Palliser, Palliser & Co., architects, for the new works of the Elwell Hardware Co.

Brookline, Mass. — Mr. O. F. Smith, of Boston, is the architect of a frame stable measuring 36' x 42', for Mr. A. S. Young.

Collegeville, Pa. — Cottage and stable for W. F. Snyder, Esq., 35' x 44', 40' x 41'; Geo. T. Pearson, architect, Philadelphia.

Crawfordsville, Ind. — Residence for W. H. Restine; cost, $6,000; C. A. Wallingford, architect, Indianapolis, Ind.

East Palestine, O. — Brick hotel for Chamberlain & Co., to cost $15,000, Harton & Talion, contractors; Guy Tilden, architect, Alliance, O.

Far Rockaway, L. I. — Mrs. M. B. Smith, is building another cottage on Wave Crest, from designs of H. Edwards Ficken, of New York.

Fernwood, Pa. — Cottage for W. B. Bullock, Esq., 24' x 44', to be of brick and shingle; Geo. T. Pearson, architect, Philadelphia.

Also cottage for J. D. Mitchell, Esq., 22' x 44'; Geo. T. Pearson, architect, Philadelphia.

Germantown, Pa. — Stone stable for C. N. Williams, Esq., 18' x 38'; Geo. T. Pearson, architect.

Harrisburg, Pa. — Three-st'y brick dwell., with brownstone finish, for Isaac Frazer; 26' 3" x 80'; cost, $15,000; C. E. Cassell, architect, Baltimore.

Hartford, Conn. — Mr. G. C. Mead is the architect of a wooden house for Mr. O. B. Colton, on Laurel St.; the building measures 37' x 50', and will cost about $5,000.

Haverstraw, N. Y. — Brick house for Adam Glassing; cost, $2,000; architect, H. G. Knapp, of New York; builders, Carson Bros.

Double brick dwells., for Charles Lane; cost, $3,500; architect, H. G. Knapp, of New York; builders, Carson Bros.

Schoolhouse to accommodate 800 scholars; cost, $12,500; architect, Horace G. Knapp, of N. Y.

Haverhill, Mass. — Cottage for W. H. Underhill; cost, $2,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Indianapolis, Ind. — Residence for James G. Douglass; cost, $20,000.

Twenty-five workingmen's cottages for Malleable Iron Works; cost, $20,000.

Ten workingmen's cottages for James Loge; cost, $6,000; C. A. Wallingford, architect, Indianapolis, Ind.

Ticket-Office, C. H. & D. R. R.; cost, $7,000; C. A. Wallingford, architect, Indianapolis, Ind.

Kalamazoo, Mich. — C. D. Nelson., two-st'y frame house; cost, $5,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Kinsman, O. — For W. Youmans, a frame cottage to cost about $8,000 is to be built from designs of Messrs. Price & Freeman, of New York.

Lawrence, L. I. — House and stable for Mr. J. F. Scott, from the designs of H. Edwards Ficken, of New York.

Mr. A. A. Hayes will also build a cottage here, near the new hotel, from the designs of the same architect.

Mansfield, O. — Brick stove foundry for the Perry Stove Co., to cost, $20,000; Guy Tilden, architect, Alliance, O.

Naugatuck, Conn. — Geo. M. Allerton, Jr., is building a house, 64' x 68', from plans by R. W. Hill, Waterbury, Conn.

Dr. Meers, house in Queen Anne style; A. M. West, architect, Waterbury, Conn.

Toledo, O. — Two-st'y brick store building, Adams St., for Mr. Rothfuss; cost about, $4,500; E. O. Fallis, architect.

Brick building for Transfer Co., Madison St.; cost, about $7,000; Gibbs & Stine, architects; A. Bentley, builder.

Frame dwell., two-st'y, Monroe St., for Mr. Walbridge; cost, about $3,000; A. S. Young, architect; A. Lombard, builder.

Two-st'y Queen Anne cottage (brick and shingles), Monroe St., for Mr. M. A. Scott; cost about, $2,500; N. B. Bacon, architect; J. H. Tappan, builder.

Four-st'y brick building, 40' x 110', St. Clair St., for Citizen's Electric-Light Co.; cost, about $12,000; N. B. Bacon, architect; A. Bentley, builder.

Two blocks containing four dwellings, frame, two-st'y and cellar, Thirteenth St., for I. P. Pagsley, Esq.; cost about, $7,000; N. B. Bacon, architect; A. Lombard, builder.

Thomaston, Conn. — Brick school-house; R. W. Hill, architect, Waterbury, Conn.

Hose, Hook and Ladder House, pressed brick, and Plymouth granite trimmings; R. W. Hill, architect.

Waterbury, Conn. — The basement of the new St. Patrick's Church has been covered with a temporary roof, so that services may be held in it while the superstructure is being built; Arthur Crooks, of New York, is the architect.

Thos. Kelley is building a brick block, with Plymouth granite finish, on Banks St., A. B. West & John Gaffney, builders; Thos. F. Jackson, contractor for stone work; R. W. Hill, architect.

Two cottages in the Queen Anne style are being built on Bank St., from plans by Mr. Joseph A. Jackson.

Chas. Hart is building a house on Grove St., from drawings by Albert M. West, architect.

The Baptist Church is being altered into a brick block with stores, from plans by R. W. Hill.

Brick block for Mrs. T. D. Dougherty, cor. E. Main and Spring Sts.; R. W. Hill, architect.

A brick school-house is now being built in the "Abrigador," from plans by R. W. Hill.

Dwelling-house for D. F. Webster; R. W. Hill, architect.

Wellsville, O. — Remodelling brick dwelling for Gen. J. W. Reilly, into a law office; cost, $3,000; Guy Tilden, architect, Alliance, O.

Wilkesbarre, Pa. — For the First Methodist Episcopal Church, an edifice to seat 800 persons is to built of stone and brick at a cost of about $50,000, from designs of Messrs. Bruce Price & Geo. A. Freeman, of New York.

Winona, Minn. — The Winona Rushford Wagon Co. are making extensive additions to their shops, to increase their manufacturing capacity from two thousand to five thousand wagons per year; building of brick, two st'y, 52' 8" x 182', with iron-room, 67' x 91' attached; C. G. Maybury & Son, architects.

An elevator, storage capacity, 40,000 bushels, is being finished for G. H. Krumdick.

Winsted, Conn. — House for R. E. Holmes, brick and Ohio stone; cost, $20,000; R. W. Hill, architect, Waterbury Conn.

PROPOSALS.

RIVER AND HARBOR IMPROVEMENTS.

United States Engineer Office,
Portland, Me., October 22 1882.

Proposals in duplicate, addressed to the undersigned, will be received at his office in Portland, Maine, **until 2.30 P. M., on Tuesday, the 7th day of November**, for improving the following named rivers and harbors, viz.:

1. *Newburyport Harbor, Mass.* — About 15,000 tons of *rubble-stone* for the southern jetty at Plumb Island, and the construction of a *dike* about 700 feet in length across "the basin."
2. *Lamprey River, New Hampshire.* — About 13,000 cubic yards of *dredging.*
3. *Cathance River, Maine.* — About 13,000 cubic yards of *dredging.*
4. *Moose-a-bec Bar, at Jonesport, Maine.*—About 25,000 cubic yards of *dredging.*

Persons desiring to make proposals for any of the above works, are requested to apply to the undersigned, at his office, No. 453½ Congress St., Portland, Me., for specifications, instructions to bidders, and the requisite blanks, and such further information as may be desired concerning the same.

GEO. THOM, Colonel of Engineers,
358 Bvt. Brig. General, U. S. A.

WROUGHT-IRON BEAMS AND OTHER IRON. [At Rock Island, Ill.]

Rock Island Arsenal, Ill., October 7, 1882.

Sealed proposals are invited to deliver on board cars at this Arsenal the following wrought-iron beams and other iron:

About 700 tons of 15-inch, 12-inch, 9 or 10½ inch and 4-inch wrought-iron beams; 35 tons of 7-inch deck-beams; 16,000 lbs. of 6-inch channel-bars, 22½ lbs.; 15,000 lbs. T-iron; 6,000 lbs. angle brackets; 16,000 lbs. flat iron, various sizes.

Full bills of and specifications for the iron and forms for bids can be obtained from the undersigned.

The successful bidder must enter into contract and give good and sufficient bonds for a faithful performance of the same.

The contractor can have until April 1, 1883, for the delivery of the iron.

Bids should be addressed to the undersigned and be endorsed "Proposals for Beams." Bids will be opened **at 10, A. M., November 8, 1882.** Bidders are invited to be present. The United States reserves the right to reject any and all bids.

D. W. FLAGLER,
358 Lt.-Col. of Ordnance, Commanding.

LOCKS AND LOCK-GATES. [At Chicago, Ill.]

Office of the Department of Public Works,
Chicago, October 16, 1882.

Sealed proposals will be received by the Department of Public Works at their office **until 11 A. M., Thursday, October 26, 1882**, for the construction of a lock, with the necessary cribs, docking, gates and appurtenances, to be placed in the channel of the Illinois & Michigan Canal, near Ashland Ave., in the city of Chicago, according to plans and specifications on file in said office.

Proposals must be addressed to the Department of Public Works, indorsed "Proposals for Canal Lock," and be accompanied with $500 in money, or a certified check for the same amount on some responsible bank doing business in the city of Chicago, and made payable to the Commissioner of Public Works.

The Commissioner of Public Works reserves the right to reject any or all bids. No proposal will be accepted unless the party offering it shall give evidence satisfactory to the Commissioner of Public Works of his ability and integrity, and that he has sufficient pecuniary resources to fulfil the contract promptly, in accordance with the specifications thereof, if awarded to him. Companies or firms bidding will give the individual names as well as the name of the firm.

DEWITT C. CREGIER,
Commissioner of Public Works.

SEA WALL. [New York Harbor.]

U. S. Engineer Office, Room 59 Army Building,
Corner Houston and Greene Sts.,
New York City, October 10, 1882.

Sealed proposals, in duplicate, will be received at this office **till 12 M., Wednesday, November 22, 1882**, for furnishing materials and labor for the construction of a granite sea wall on Governor's Island, New York Harbor. Appropriation, $30,000.

For information, blank forms, etc., apply at this office.

G. L. GILLESPIE,
359 Major of Engineers.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & CO., Boston, Mass. No. 358.

NOVEMBER 4, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE Convention of the American Institute of Architects in Cincinnati last week was in every way successful and pleasant, and the indications of present prosperity and future progress were such as must give great satisfaction to every member. The attendance was not so large as it has been at some conventions, but twenty-six gentlemen, representing ten States, answered to their names at the first day's roll-call. The introductory address was delivered by Colonel George Ward Nichols, of Cincinnati, and deserves to be remembered as one of the most suggestive discourses ever given before the Institute. We shall have the pleasure of referring to the address more at length hereafter, and need only say that it was received with enthusiastic applause. The report of the Board of Trustees, which followed, showed that thirteen members had been advanced by election from the grade of Associate to that of Fellow during the year, and seventeen Associates had been added to the list. One honorary member, General J. D. Cox, of Cincinnati, and one Corresponding Member had been elected. Business relating to the future affairs of the Institute was next in order, and two amendments to the By-laws were proposed, one of them extending the limit of the number of Fellows from seventy to one hundred, and the other providing that a new chapter of the Institute might be formed on the application of one Fellow and two Associates, instead of two Fellows, as at present. In accordance with the rules, a committee was appointed to present the amendments in the form of a circular to the members before the next Convention when they would be called up for action.

THE evening session was devoted to the election of officers. Mr. Walter, of Philadelphia, was re-elected President, and Mr. Ware, of New York, was chosen Secretary. The present Treasurer, Mr. O. P. Hatfield, was elected for another term. For Trustees, Messrs. Congdon, Cady, Bloor, and Le Brun, of New York, were chosen, in addition to the President, Treasurer, and Secretaries, *ex officio*. Messrs. Bloor and Holly, of New York, Clark of Boston, McArthur, of Philadelphia, and Mason, of Newport, were elected as Committee on Publications, and Messrs. Ware and Potter, of New York, Ricker, of Illinois, Van Brunt, of Boston, and Stone of Providence, R. I., as Committee on Education. Mr. Clark, of Boston, was re-elected Secretary of Foreign Correspondence.

THE second day was devoted to the reading of the reports of Chapters and papers on professional topics. On motion of Mr. Stone, of Providence, it was voted to hold the Convention of 1883 in Rhode Island, one day's session to be at Providence and the other at Newport, and the Board of Trustees was instructed to appoint the time of meeting, which should be either in July or August. A further motion was offered and adopted, that each member should be invited to present a drawing of an architectural subject for exhibition at the Convention, and the meeting was then adjourned.

THE circular of invitation to artists to submit competitive designs for the statue of Paul Revere in Boston has been issued, and as the erection of a twenty-thousand-dollar monument in the most conspicuous place in a large city, is, as we take it, a matter of public interest, we venture to make some comments on a document which does not seem to us adapted to secure the result which its authors intend. The circular invites artists to submit models for a statue, equestrian or otherwise, of the hero, with estimates of the "cost of construction," on or before April 19, 1883. All the designs are to be anonymous until after the decision, and for each of the best three models a sum of three hundred dollars will be awarded. Nothing is said as to the required scale of the models; nothing as to whether the artist is to design the pedestal, or whether the cost of the pedestal is to be included in the estimate submitted. Nothing is said as to whether the author of any of the designs will be employed to carry out his design; on the contrary, the wording of the circular, which says that "for each of the best three models a sum of three hundred dollars will be awarded," leaves it uncertain whether the three hundred dollars is to be given in the usual way as a premium for merit, or as an equivalent for the model, the property in which would thereby pass to the committee. Concerning the person or persons who will make the award nothing whatever is said, and there is no indication that the committee itself, which consists, according to the Directory, of one physician, one distiller, one elevator proprietor, one machinist, one architect, one dealer in stationery and fancy goods, one grain-dealer, one plasterer, one glue manufacturer, one copper-refiner, one leather merchant, one editor, one police commissioner and one lawyer, may not be the sole jury. We cannot help hoping that this invitation will be explained or modified without delay. To say nothing of the looseness of statement as to the requirements, the rewards offered are far less than the value, to a sculptor who can find other employment, of any model large enough in scale, and sufficiently well worked out, to be of the slightest use in indicating the character of the finished work, while the real prize, the execution of the statue, is not promised to any competitor; but instead of that, the suggestion is at least implied that the authors of the most meritorious works may, by the effect of the curiously-worded clause about rewards, be compelled to see their designs mangled and caricatured in execution, to the ruin of their reputation, without being able to help themselves, or get any redress. It is extremely improbable that any respectable and honorable sculptor would give a second thought to such an invitation; but for the benefit of those who may be tempted by their pleasure in the thought of working out so brilliant a *motif* as the story of Paul Revere suggests, we will say, as our deduction from a long experience of competitions, that their prospect of having their idea appreciated, and perhaps carried out, will not be increased, but diminished, by entering the competition, and that the person who will ultimately be entrusted with the execution of the statue is pretty certain to be one who has not cheapened himself before the public, and destroyed his reputation with the committee, by condescending to struggle for their insignificant prizes on the terms which they propose. Unless the choice among the models is placed absolutely in the hands of one or more professional sculptors of high reputation, who should be joined with an architect if a pedestal is to form a part of the design; and unless, also, the execution of his design at a liberal remuneration is promised without reserve to the person who receives the highest award, no artist should think of meddling with the competition. The sculptors do not form a very large class in the community; one of them, if the statue is carried out, must ultimately have the commission; they can fix their own terms as to the way in which the choice among them shall be made, and they will have the support of the best part of the public in making those terms such as will secure to all of them who deserve it honorable distinction, with a prospect of winning by merit high reputation and liberal remuneration; the city of Boston gaining at the same time what is likely, if chosen in such a contest as we describe, to be a monument of conspicuous excellence.

BY a mischance which came so near being infinitely more terrible that it seems itself almost fortunate, the Park Theatre in New York was totally destroyed by fire on Tuesday evening, about two hours before the time set for the performance. A few persons were at work on the stage, where the first scene for the play of the evening was already set, when the painter, leaving his work after the last touches, saw a flame licking the partition between the proscenium-boxes and the

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stage. The fire seemed to come from one of the proscenium boxes, but quickly drew through the arch upon the stage and among the wood and canvas of the scenery. The alarm was instantly given, and a number of fire-extinguishers which stood ready were seized by the workmen, but proved useless. Buckets of water were thrown on the flames, together with streams from several lines of hose, but without effect; the fire spreading with such rapidity that the brave men who remained a few moments to fight against it barely escaped, two indeed losing their lives, and the theatre was soon in ruins. The building was a comparatively new one, having been constructed in 1874, and though small, was very richly decorated. The furniture and theatrical properties, which belonged to the manager, were valued at about one hundred and fifty thousand dollars, and the loss on the building and on property in the stores on the ground floor — one of which, we are sorry to learn, was occupied by the well-known decorator and designer of paper-hangings, Mr. C. H. George — will amount to nearly as much more.

The lovers of old English domestic architecture will regret to hear of the destruction by fire of Ingestre Hall, in Staffordshire. This beautiful Elizabethan mansion was still occupied by the descendants of the knight who held the manor in the reign of Henry II, about the middle of the twelfth century, and although the varying fashions and needs of so many centuries had given occasion for various alterations and improvements, these detracted little from its historical or picturesque interest. The fire is supposed to have been caused by the overheating of a beam which supported the ancient fireplace of a state bed-room, and burnt for about five hours before it could be subdued; most of the mullioned stone windows, with the furniture and wood-work of the state apartments, being by that time destroyed or seriously damaged. The billiard-room, which was one of the most ancient and beautiful in the building, wainscoted with oak in grotesquely-carved panels, was saved intact, together with the servants' rooms and household offices, which occupied the remainder of the east wing.

Judiciary Square in Washington, the place which was fortunately not chosen as a site for the Congressional Library, has been assigned to the building intended to be erected by the Government for the Pension Office. The square forms an excellent location for this purpose, and is, indeed, the only available one under the law which provides that the Pension Office shall be erected on land already owned by the general Government; so that there is certainly no reason to regret the appropriation for a comparatively small building of a site which would be very unsuitable for a large and important one.

An occurrence which could not have been possible except by gross negligence on the part of some one is reported from Philadelphia. It appears from the account given in the *Telegraph* of that city that a serious leakage of gas was noticed some time ago by the residents upon a certain street, some of whom were made ill by the noxious odor. The officials of the gas company were repeatedly notified, but nothing was done. A week had elapsed since the discovery of the leak when, early one morning, an explosion occurred, probably in the sewer, which threw a man-hole cover a hundred feet into the air. A minute after another explosion occurred, blowing out a second man-hole cover, followed by a third, and three minutes afterward by a fourth; each explosion throwing out the nearest man-hole cover, and shaking the houses in the vicinity. The fourth report was followed by a burst of flame from the sewer, the gas continuing to burn at the mouth of the opening until the tardy employés of the Gas Trust came to shut off the supply. Not till then was a serious search made for the leak. It is most fortunate that the damage done by the explosions was so slight. A much less important escape of gas in Paris nearly caused the ruin of several buildings, and if the sewer in Philadelphia had not happened to be so situated as to draw the current away from the neighboring houses, a dozen of these might have been blown into the air.

A test in place of a certain bridge in Paris which carries the Rue Lafayette over the tracks of the Chemin-de-fer de l'Est was made recently to determine whether loaded trucks could safely pass over it. The bridge is made with metallic arches, and hitherto has been used only for light carriages and pedestrians, heavy teams being obliged to go around another way. The test for dead load was first made by piling two thousand iron rails upon the roadway of the bridge, and leaving them in position for two days. The weight amounted to about four hundred tons, but no material deflection was produced. The rails were then removed, and the test for live load was made by traversing the bridge with road-rollers belonging to the street department, two of them abreast being driven over it at full speed several times in succession. Under this severe trial the utmost deflection of the arches was only four and one half millimetres, or about one-sixth of an inch, and the result was regarded as so satisfactory that the bridge was immediately thrown open to traffic of all kinds. Such tests as this we fear, would be regarded as altogether too harsh for the delicate structures built by some of our own engineers. What would the designer of the bridge which was crushed by the weight of a cow, for instance, or of that which collapsed because the "head of a bolt flew off," say to having their fragile creations exposed to the remorseless concussion of a couple of twenty-ton rollers driven back and forth over them? There is something to be said, so far as the people who are to use bridges are concerned, in favor of having their soundness proved beyond question before any lives are risked upon them, but we all know that American engineers are distinguished for the boldness of their constructions, and it would be indeed hard if their fellow-citizens should refuse to show a corresponding boldness in venturing themselves upon them.

The *Scientific American* calls attention to the fact that sawdust is better than hair in preserving rough-cast plastering for the outside of buildings from scaling and peeling under the influence of frost and weather. "The sawdust," it says, "should be first dried, and then thoroughly sifted, to remove the coarser particles. A mixture is then to be made of two parts sawdust, five parts sharp sand, and one part cement, which should be thoroughly stirred together, and then incorporated with two parts of lime." This seems to be a new application of observations made by the masons of forty years ago, who were employed in the construction of the "stucco" or "mastic" fronts so popular at that time. Most of these, made by a coating of colored cement and sand on a foundation of brickwork, have long since peeled away, but before the fashion of them died out it was generally understood that no substance could compare with sawdust as a bond for holding the coating together and to the wall. In the application of the principle to rough-cast plastering, as now employed, we would make a further suggestion,—that the rough-cast be laid on wire lath. For wooden buildings there is no difficulty in applying the wire, and it can be nailed with little trouble on the surface of brick walls, giving in both cases a stronger hold for the mortar than can be obtained by any other means.

The Philadelphia *Times* mentions that the white efflorescence on brickwork, known to the ignorant as "saltpetre," has been particularly common in that city during the present season; several old buildings, which had long been free from it, showing as much incrustation as those of very recent construction. A reporter seems to have been enterprising enough to question Dr. Joseph Leidy, President of the Academy of Natural Sciences, upon the subject, and repeats with remarkable correctness what is certainly the true explanation of the phenomenon. According to Dr. Leidy, the efflorescence is composed of sulphate of magnesia, which is in most cases easily shown by analysis; and is produced, he thinks, by the action of the sulphurous acid always contained in the air of cities upon the magnesia salts in the mortar with which the bricks are laid. There is, we believe, some doubt whether the sulphurous and sulphuric acid of the atmosphere alone is sufficient to produce the effect. It is always observed that a wall, the top of which is exposed to the rain, or which receives water into its interior in any other way, soon shows a copious efflorescence, as if the magnesia salt was dissolved in the heart of the wall and brought to the surface by the evaporation of the water, so that some imagine that the coal used in burning bricks about Philadelphia and other sea-coast towns may leave a sulphurous deposit within their pores, which acts on the lime, or rather on the cement, with which they are built.

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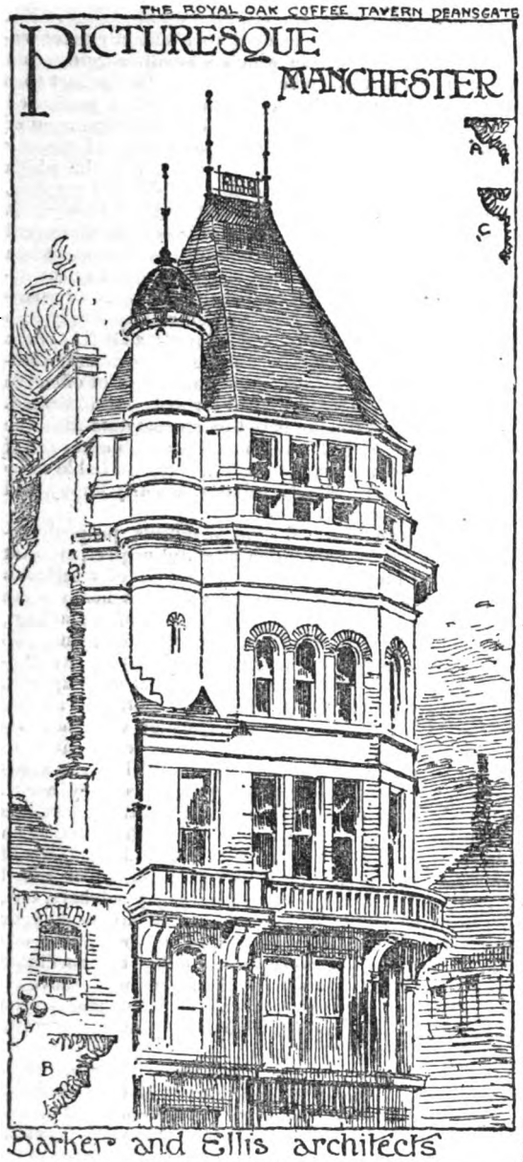
BUILDERS' SCAFFOLDING.—VI.



(From the *British Architect.*)

CHURCH-spires and towers are usually carried up with outside scaffolding surrounding them. It is usually of the single-faced description, the standards made of two or three thicknesses of scantlings, as 2″ x 6″, bolted together, with wind-braces footed on the ground, and transoms, and cross-panel braces in successive stages. The working-platform is carried on triangular brackets nailed to the sides of the standards. A hoist frame[1] of four posts similar in form and construction to the "Gabbert" structures already described, with a hoist "basket" is usually attached on one side of the tower to the scaffold, for the purpose of raising materials. This scaffold is usually set far enough away from the walls of the tower to admit of projections, pilasters, octagon corners, and other architectural or structural features being so introduced as to avoid any interference with the scaffold. When only one or two thicknesses of scantlings are used to compose the standards, solid wood brackets or cleats are nailed to the standards to support the ledgers, and they are further secured by rope lashings tightened by wedges as previously described.

In the case of halls, churches and other auditoriums where ceilings are very high, three thicknesses of scantlings are bolted together for standards to form double-faced scaffolding, with the usual ledgers, diagonal bracing and putlogs.

In England, London particularly, double-faced *pole* scaffolds are used, erected partly inside and partly outside, with a tier of standards on both inside and outside of front walls, at a convenient distance apart to afford room for a working-platform on both sides of the wall, with corresponding ledgers lashed to both tiers at proper heights for successive scaffolds. Strong putlogs or *needles* are run through the fenestral openings in the façade, and where piers occur which are too wide, making too great an interval for a single span of the planks forming the platform, or where solid portions of the wall thus interfere, then auxiliary ledgers are lashed to the "needles" or main putlogs, which support secondary or short putlogs, which in turn support the planking at necessary intermediate points. When solid projecting story cornices, belts or other horizontal features occur convenient to the height of a platform, they are sometimes used as supports for the inner ends of short putlogs, and thus do away with the auxiliary ledgers, or making holes for short put-logs in ashlar walls. This system also relieves the green walls of the mischievous disturbing weights and oscillating forces produced by movements on scaffolds whilst building operations are being carried on. All cross-bracing must occur through the openings between opposite standards. This system has also the advantage of providing simultaneously for both inside and outside scaffolding with only two sets of standards and ledgers. It is also useful when iron or steel joists are employed. Where the thoroughfare is narrow and heavy stones are used in the lower stories, and other concurring circumstances necessitate the mounting of a crane upon an elevated staging, for the purpose of setting large stone or iron columns, etc., then square timbers or logs are used for the standards inside and outside of the staging; the ledgers and needles are also of square timbers, and all are fastened together by dog-irons. The standards in such case are footed down upon timber sleepers laid flat on the pavement on the one side of the wall, and upon the ground on the inside. The staging is of heavy planking. For the superstructure double-pole ledger scaffolding is afterwards erected upon this staging, reaching high enough to serve the remainder of the stories above.

In cases where moulding, carving or sculpture has to be done after the stone is set in the building, a supplementary pole scaffolding is introduced intermediately of the square timber scaffold which is erected in the first instance for the constructive purposes of the building. For the supplementary purposes the standards are only of single poles, and the bracing is secured to the main scaffolding standards, etc.

When scaffolding is required to run high, it is usual in good construction to introduce flying wind-braces in order to increase the stiffness of the upper portions of the standards, as well as to carry up the stability imparted by the ground braces.

Pole scaffolds offer less obstruction to wind-storms than square timber and are lighter for handling, and in general are considered stronger and more elastic, section for section, than square timber or scantlings.

The footing of standards where no pavement is yet laid over a deep, front cellar area, sometimes rest on beams laid across the area from the cellar wall to the street curb wall.

In all outside scaffolds in English cities, whether intended for brick or stone masonry, it is imperative to place a hoarding of boards around the outside of each successive working-platform in the height of the scaffold 3 feet or 4 feet high, which not only serves as a guard-rail to the masons and laborers working on the platform, but also prevents brick, débris, etc., from falling down upon persons below. This very desirable precaution should be more generally adopted in American cities, as accidents and very narrow escapes are frequently occurring in the absence of such safeguards.

In London and large provincial cities of England, where the sidewalk or a very confined space is permitted to be hoarded in from the abutting street or lane which is much of a thoroughfare, the top of the outside fencing or hoarding is made to dish outwards several feet at an angle of 40 or 50 degrees, the better to catch or prevent falling outside of the hoarding all dust, débris, etc., which may fall when a change of scaffolds is taking place. This is also worthy of adoption in American cities.

When standards or "Gabbert" posts are constructed of several thicknesses of planks, the joints should be regularly broken at equal distances apart, as this is important, and frequently seems to be done in a hap-hazard manner, in disregard of all system, some of the contiguous joints being too close together to impart the utmost strength to the combination. The most care is required about the middle distance in the height, say to include the middle one-third of the entire length from top to bottom, where the distorting forces act with the greatest leverage and produce the maximum intensity of strains. It may be well to point out to the novice that an understanding at a glance of a systematic disposition of the butting joints is very simple: thus, if two thick

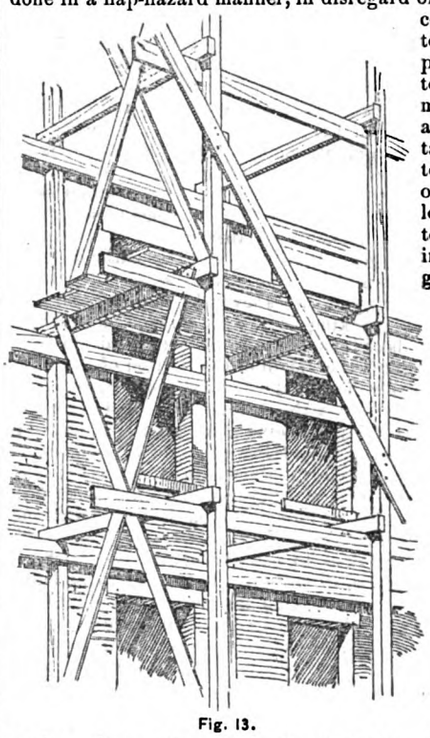


Fig. 13.

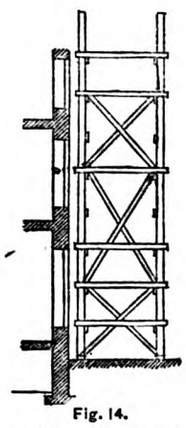


Fig. 14.

[1] As the crane is so inseparably connected with builders' scaffolding, it may in a future paper of this series be found advisable to describe and illustrate this particular form as well as others which are used elsewhere as accessory appliances.

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nesses of scantlings are to be employed in combination the butting joints will occur at the middle points of the alternate pieces when the composing pieces are all of equal length, and if three thicknesses of scantlings, the butting joints will occur at the one-third and two-third points in the length of the alternate pieces, and similarly, if four pieces are combined the joints will occur at one-fourth points, *i. e.*, at one-quarter, one-half and three-quarter distances in the length of the alternate pieces. The transverse pieces should be inserted at the butting joints, when they cut through the upright pieces.

The variety known as double-faced ledger scaffolding is shown in perspective elevation by Figure 13, and a geometrical section of the same is represented by Figure 14. In some parts of America and in England it is mostly built of poles, similar to those used in the single-faced scaffold illustrated in Figures 8, 9 and 10, in the October paper. In Paris it consists of *spars*, by which we mean heavier and longer dimensions than those which we denominated *poles*, already described. In the eastern parts of America and in England it consists of timbers or of heavy scantlings. In the Western States light (and generally insufficient) scantlings are principally used. Generally speaking, however, it may be noted that for extensive or important public or private buildings in this country and in Europe square timbers or heavy scantlings are employed; the English builders adopt heavier scantlings than the American builders for similar classes of work; this is irrespective of the qualities of the timber which may be used for such purposes in either country. It may be safely assumed, as a rule, that a large proportion of the better qualities of timber is exported to England, which has as well the advantages of better seasoning, and as seasoned timber is usually estimated to be one-sixth to one-half stronger (transversely) than green timber, it is important to bear this in mind when specifying the scantlings of timbers (liable to be green or insufficiently seasoned,) which are intended to be used in any part of a structure where exposed to transverse strains.

The later practice in London of adopting by preference the double-standard, inside and outside, variety of scaffold described in the October number (5th paper), is gaining rather general adoption in other parts of England. It can, of course, only conveniently be used where the fenestration admits of it, as it cannot be adopted for the erection of dead walls.

The double-faced scaffolding is adopted when it is necessary to avoid putlog holes, as in ashlar or pressed-brick veneering, or in the square stone-work which prevails in Paris and in Scotland. It consists of two tiers of standards and is usually built on the outside of a façade; the inside tier is set up at a sufficient distance from the line of the wall to be clear of all structural, ornamental or other details projecting beyond the line of the wall, the two tiers of standards being set such distance apart as will afford the necessary working extent of platform, and at the same time be suitable to the transverse strength of the scantlings of the putlogs and ledgers which are intended to be used, having regard to the maximum weights which are likely to load the platform. Such distance apart of the two tiers of standards usually ranges, say, from six to twelve feet, according to the nature and extent of the operations for which it is required, the spacing of the individual standards of both the inside and outside tiers being ordinarily eight to twelve feet, the corresponding standards of each tier being set regularly opposite to one another, the better to admit of effective cross-bracing between them. Diagonal bracing is fastened across several of the standards in a longitudinal direction on the outside tier, which insures the necessary stiffness against oscillation. Each tier of standards has its continuous tiers of ledgers at corresponding heights, suitable for the successive scaffold-high tiers of working-platforms which are to be laid up as the wall advances in height. Putlogs of scantlings, usually of oak, sufficient to resist the transverse strains, are laid across the two tiers of ledgers, and if the working-platform should be extended inward between the inside tier of standards and the wall—which space in Paris is sometimes several feet wide to admit of the convenience of having working room and passage inside of the standards — the outer ends of them ought to be fastened down to the ledgers to prevent tipping up; the weight of the portion of the planking and putlogs lying outside of the ledger of the inside tier of standards, and which would represent the longer arm of a lever, the ledger itself acting as the fulcrum, being much greater than the effective weight of the portion of them lying on the inside of the same ledger, and which would represent the short arm of the lever; there is sometimes assumed to be enough difference to counterbalance the weight of workmen and mechanics likely to be on the inside portion of the platform. There are, of course, usually materials on the scaffold, so distributed as to be sufficient to counterbalance the workmen, but if heavy weights of stone, iron, timber, etc., have to be laid in the wall danger may arise through an insufficient distribution of weights on the long arm of the lever to counterbalance such extra weights on the short arm. Thus, for example, if the planking weighed $5\frac{1}{4}$ lbs. per superficial foot, and the putlogs $\frac{3}{4}$ lb. per superficial foot, and the longer arm of the lever be 9 feet, which multiplied by $(5\frac{1}{4} + \frac{3}{4})$ 6 lbs. = 54 foot-pounds, and the short arm is 3 feet or one-third of the length of the long arm, and consequently one-third of its weight and leverage, or 18 foot-pounds, the difference of leverage or effective weight between the long and short arms would consequently be 36 foot-pounds per lineal foot of the scaffold; and therefore, if the short arm were not loaded to this extent, or if the effective excess of loading on the short arm over that of the long arm did not approach this normal difference, there would be no tipping up of putlogs. But there ought to be sufficient surplus loading to avoid any inaccuracies in the estimates of the differences which a small margin would not be liable to compensate for. The danger lies in the fact that the mechanics and workmen usually do not, or are not permitted the opportunity to stop and consider these niceties of adjustment of weights when suddenly called on to mount upon a scaffold already erected, — perhaps without proper consideration of the strains which may come upon it, — and use the platform in a hap-hazard manner, and as a consequence it frequently happens that accidents occur. It is therefore always advisable that all needful precautions in this regard should be taken by the scaffold-builder in the first instance when erecting it, either by adopting usual or special safeguards in the arrangement of the construction, or by having the undoubted assurance that the ordinary manner of construction will be amply safe under the conditions in which it is to be employed; as if this is not done it is very liable to be overlooked when the ultra-normal conditions alluded to arrive, which brings about an excess of effective loading of the short arm, and not provided for as before indicated. It is advisable that a proper estimate based on correct data with due allowance for all probable exigencies be made for each case, and if any limiting conditions are necessary to be imposed and liable to be exceeded in any instance, such should be conspicuously known and strictly enforced by the contractor.

It must be further borne in mind that *accidents*, properly so-called, may occur without the intervention of wilful neglect, or what would usually be regarded as carelessness on the part of mechanics or laborers, such as the slipping of a mason's hold of a heavy stone in lifting or setting it, and its consequent fall on the platform, which in all likelihood it brings down along with it, carrying also with it, perhaps, some of the men working on the platform; or an entire section of the scaffold, together with all the men at work upon it, may thus be brought down from a considerable height, with all the attendant fatalities. It is, of course, a vital question with those responsible for the sufficiency of the scaffold, how necessary it is to guard against occasional accidents of this class by a surplus strength of scaffold, beyond what is requisite for ordinary needs. Much would naturally depend on the class of building, methods adopted of handling such stones, etc., upon the scaffold, whether on wheel or hand barrows, or carried or lifted in the unaided hands of the workmen, or raised by derrick, or rolled upon rollers, or rolled bodily over, or slid along by means of handspikes, pinch-bars, etc., or other ordinary or extraordinary methods which are usually or occasionally resorted to by masons or workmen under varying circumstances; and hence if there were any liability of inordinate strains being produced by the use of any of the methods above alluded to, there would necessarily be reasonable cause for making the scaffold so much stronger than required to merely resist the static weights as ordinarily put upon it.

Such a provision to meet emergencies was the primary object of factors of safety, so-called, and if a coefficient of five or six were given to the static strength of the scantlings and fastenings of all the members of the structure, making due allowance for the deterioration in strength caused by all knots, cross-grain and other accidental weakening defects in the materials, such occasional short-comings within the range which ordinarily happen under careful management and adequate appliances, as alluded to, would not be liable to produce results so disastrous as, unfortunately, usually attend them when the scaffolding and appliances are of the inferior class and quality commonly met with in ordinary building operations. And here might allusion be appropriately made to the prevailing pernicious practices of employing cheap, but which too often in the end proves very dear, skilled labor or materials. To this system, in great measure, is due all the customary mishaps which befall building operations.

In connection with single and double ledger scaffolds, a separate staging eight to twelve feet square, for steam or horse power hoists of any form, is frequently attached outside of the scaffold for the purpose of hoisting and dumping materials for distribution to the masons, along the working-platform of the scaffold. It is formed of standards, ledgers, putlogs, and diagonal bracing, in directions perpendicular to each other, in successive stages to correspond to the several levels of the working-platforms, as they ascend with the wall as it advances in height.

For the heavy ashlar work of large public buildings where large blocks of stone, ranging, say, from two to eight or nine tons, have to be handled, a stronger form of scaffold is necessary in connection with adequate appliances, — and therefore in England and other parts of Europe, what is termed the *framed* whole (square) timber scaffold is usually adopted. It is numbered 2 in the preliminary classified enumeration of the varieties of scaffolding, and is represented by Figure 15. It is usually built in superimposed successive stories, and is composed of ten or twelve inch square or *whole* timbers for standards, — say twenty-eight feet high, — but more or less, according to the heights of the stories of the proposed building, clearance being required between the travelling-crane and top of the wall proposed to be reached before a higher story of the scaffold is superimposed, and for the hoisting-tackle, shear and lewis-chains, etc. The standards are set in two tiers, one inside and the other outside the wall to be built, and at such relative distances therefrom as shall serve for inside and outside tramways, etc. The standards are footed upon sleepers or sills of similar scantlings laid solidly along the

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ground and properly bedded so as to be firm and unyielding — the foot of the standards are sometimes stub-tenoned or gained, say a half to one inch, into the upper side of sill — and fastened by band-iron straps, spiked, pinned or bolted to the timbers, or, in order to avoid injuring the timbers for other constructive purposes after having served this one, simply fastened by iron "dogs," without any gains being cut or bolt-holes bored: dogs being 20 to 30 inches of, $\frac{3}{4}''$ square or rod iron with pointed ends about 3 to 5 inches long turned at right angles. Horizontal beams or "runners," say 8″ x 12″, or larger dimensions, according to the extension of spacing between standards, which is usually regulated by the fenestration to admit of transverse footing-timbers and diagonal bracing passing through the openings between the inside and outside tiers, are laid along the heads of the standards and similarly secured to them. Sometimes cap or corbel blocks are introduced between the horizontal timber and the head of the standard, and similarly fastened to the timbers both immediately above and below the corbel. The whole combination is preserved from swaying or rocking longitudinally by strut, or reverse queen-post, bracing, the upper end abutting against a fixed block or straining-piece, which sometimes occupies nearly the middle one-third of the span between the standards, when it is large. The straining-piece is secured in place by being bolted to the ledger-timbers, or otherwise fastened by means of dog-irons placed in opposite oblique directions. Transverse bracing of the structure, to prevent swaying sideways, is accomplished by ground raking-braces on either side of the scaffold, firmly footed against blocks and piles driven into the ground at proper angles to securely resist the directions of the thrust. These braces are also secured to the standards and foot-blocks by means of bolts and cleats or iron dogs. Along the top of the upper horizontal timbers railway-tracks are laid; on these travelling overhead cranes or derricks are run, worked by hand or steam power, for the purpose of conveying to and depositing in its proper place the material to be set in the building. In Figure 15 is also shown a transverse view of the scaffold in working position with a track or tramway shown on one side of the wall being built, for the purpose of transporting materials from any distant point, as the stone-yard or quarry. Whole timbers are generally used for standards, sills and runners, half-timbers for struts and braces. When the wall has been raised as high as the first stage of the scaffold will admit, a similar structure is built upon the top of it, and repeated superpositions of such similar structures are imposed to any required height, the successively imposed standards being placed over the preceding ones to prevent cross-strains on their sills, each successive one that is imposed being secured to the lower one or to the horizontal timber on which it rests, which now becomes its sill, by dog-irons. Trussing and bracing is similarly repeated in each story high of the successive structures, but the wind-brace instead of being footed on the ground is bolted to the outer ends of a pair of horizontal half-timbers called

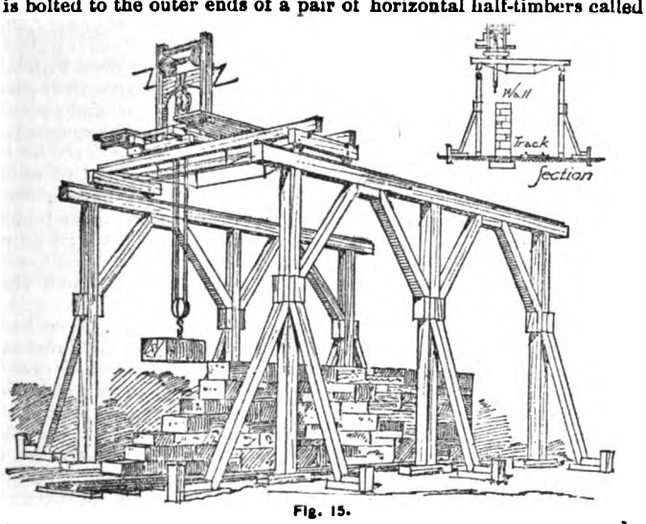

Fig. 15.

footing-pieces, laid across the lower-stage runners, passing through openings, and bolted one on each side of each standard; struts support their outer ends by being cleated to the standards. The tramway, crane, etc., are transferred to the top of each successive stage as it is superimposed, by means of masts guyed in different directions, and strong block-and-tackle gearing. When the stages are very high the above raking-bracing is repeated in reverse positions on both tiers of standards transversely, and also longitudinally, when the standards are a considerable distance apart, the foot of each longitudinal brace resting on the sill over each corresponding queen-brace. However, when this is not the case, and as the queen-bracing or struts mainly serve to resist transverse strains on the runners which support the travelling-crane, when it is transferred to a higher level by the addition of another story, causing, by increased exposure and leverage at a higher elevation, greatly increased side or wind strains, the strutting will serve to resist these only to the extent of the transverse *stiffness* of the upper sill-timber, between adjacent standards, and should any intense racking-force exceed this, the stability of the combined structure is lessened. It is therefore advisable especially where not only heavy weights are to be vertically lifted by steam-cranes, but also oblique pulls may be required, that firm diagonal bracing across several of the standards at a time in the form of a St. Andrew's cross be added to both tiers in each story, thus bracing or stiffening the structure longitudinally. It is also advisable, in order to counteract all transverse racking-strains, which the working of powerful steam travelling-cranes at high altitudes necessarily imposes on the scaffolding, that transverse diagonal bracing of the standards be done in both an inward and outward direction, passing through the openings, which, however, must be arranged so as not to interfere with the hoisting by the crane, and that the strutting be carried well down on the standards, where they will afford sufficient transverse resistance. Heavy plank platforms are laid for convenience across the footing-pieces, when not interfering with the hoisting, and when the span is too long auxiliary "needles" are laid across the sills to support the planking at intermediate points. When brick or rubble backing (the latter backing being the general practice in Scotland,) requires to be done, masons' inside working-platforms become necessary, and are erected in the single-ledger method, with poles or scantlings, between the floor-joists; and likewise, when moulding, carving, etc., require to be done on the façades, double-ledger scaffolds are erected inside the framed standards.

In order to effect economy of construction and simplicity and convenience of erection, transfer of working-platform, handling, etc., of scaffolding, especially for laying up brickwork in ordinary house-building, portable adjusting standards are adopted for the purpose, which dispense with ledgers, but require a greater number of standards in a given length of scaffold, as their distance apart, which forms the span between bearings, depends on the transverse strength of the boards or planks which form the working-platform. There are usually two forms, shown in Figures 16 and 17. The former is usually constructed of 3″ x 3″ oak scantling 14 to 16 feet long, tenoned into a foot-piece about 30 inches long, and rendered immovable on either side, gained into both the standard and the foot-piece, and fastened at each of these joints by screws. Sliding clamp-rests of band-iron forged into the outline form of an elbow in plan, with a pin riveted across the centre, support the putlogs. When the part of the clamp-rest through which the standard slides is held square with the standard there is a clearance between the pin and the end of the clamp, so that when the end of the putlog rests upon the other end of the clamp it then becomes level, and the end which clasps the standard becomes inclined so that the pin *bites* the standard on its one side, and the upper edge of the clasp also at the same time bites its opposite side, and by this means, acting somewhat in the nature of a bent-lever with a vice-like force, it is secured from sliding down when weight is put upon the putlog. In fact, the more the weight the firmer the bite or grip of the clasp upon the standard. The other end of the putlog rests upon the wall, being built as in the single-faced ledger scaffolding previously described.[1]

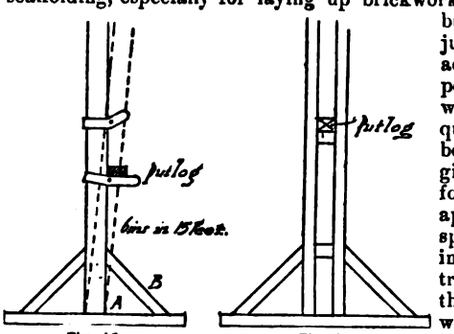

Fig. 16. Fig. 17.

In setting up these standards, and indeed all standards in any form of scaffolding, care should be taken to have them plumb, to avoid throwing the strain on the foot-piece near to the strut-joint, or to endanger its tipping over in a longitudinal direction, thus endangering the safety of the scaffold. Bracing longitudinally is seldom attempted or necessary, but transverse bracing becomes necessary, but is seldom resorted to, and then only in a very make-shift way, such as nailing a stay-lath or strip to a joist at one end and to an outside board or plank of the scaffold platform at its other end. When the wall has reached "scaffold high," a part of the platform boards are taken off two or more of the adjacent putlogs at a time, the iron clasp-rests which are thus freed are slid up the standard to the next scaffold height, the putlogs are laid on the clamp-rests and on the wall, and the platform boards are transferred from the lower to the higher level, and this operation is repeated along adjacent sections of the scaffold, until the whole platform is transferred. By placing a few extra standards and putlogs in position alongside of those where the transfer is to be commenced, the boards can thus be transferred to form the upper platform without requiring unnecessary handling.

Transverse bracing (if any,) in the higher stages is of a similar nature to that already described, but probably nailing to a window-frame, or some such indifferent method is resorted to, though it may be noted that when not over two scaffolds, or ten feet high, and when no very severe dumping or other oscillating strains are a result of the operations carried on upon the scaffold, a very slight bracing, when in an *effective* position, serves to prevent the initial movement of the standards out of plumb, especially when there is considerable weight of materials upon the scaffold, though on the other hand, when a movement is *commenced*, the strains increase in an alarming

[1] Should a large opening occur opposite to one of these adjustable standards an extra standard is placed in the opening to support the wall end of the putlog. Planking or boarding is laid across these putlogs to form the working scaffold.

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ratio, and hence, considering that the due appreciation of the true mechanical value of any change or interchange of these several conditions, or a departure from safe conditions, is a very precarious contingent, it is advisable that no risks be incurred, and that more certain methods be adopted.

Figure 17 is constructed of two pieces of 2″ x 4″ placed parallel to each other and about 3″ apart. Six-inch blocks, fitting between, are spiked thereto at proper successive heights to suit the intervals of stages found necessary to accommodate the successive working-platforms required for reaching the heights of stories in any building. This standard has footing-pieces and struts similar to those described for the preceding figure. The putlogs rest on the intermediate blocks successively as the wall rises to the "scaffold high;" the platform is transferred to the higher stages in a similar manner to that just described for the preceding method.

BUILDING SUPERINTENDENCE. — XXIII.

PART III.

THE third division of our subject will treat of a more complicated piece of construction than either of the preceding, and will lead us into the consideration of the stresses and resistances of materials in a way which should be familiar to every young architect. The habit of analyzing designs with regard to their merit as structures is one of the most valuable that such persons can form. To say nothing of the importance of acquiring that constructor's instinct which is the best safeguard against the slips that often bring discredit upon the most highly trained men, this same constructor's instinct, built up, so to speak, by the constant consideration and appreciation of weights, thrusts and resistances, is the main element of power in architectural design.

A certain amount of prettiness and refinement is within the reach of the architect who cares and knows nothing about the concealed construction which is to hold up his pretended arches and lintels, but the mind soon tires of detected sham, while it finds ever increasing pleasure in the masterly ease and originality which come from the skilful handling of brick, stone and wood as materials to be frankly used in satisfying the various conditions of modern structures. With us, unfortunately, certain important classes of building, such, for instance, as city dwelling-houses, have fallen into a routine of construction, which, if not positively vicious, offers at least few opportunities for the solution of novel problems; so that it is all the more important for the younger members of the profession to seek out and study special constructions, in order to keep their minds prepared for the difficult programmes which will sooner or later be set before them.

How this may be done can best be shown by means of an example which is to be considered in the way in which an intelligent architect would either study the details of his own design, or would criticize the work of another. The problem chosen is that of a town-hall, measuring seventy-five by one hundred and fifty feet, containing municipal offices in the basement and first story, and a single large room above for public entertainments. This room is divided into auditorium and stage by a brick wall, the proscenium-arch being a real construction of stone. The thrust of the arch is resisted on one side by the weight of a tower, which rises to a considerable height above the roof, and contains a fire-proof staircase, as well as a ventilating shaft; and on the other by the wall of a small dressing-room. Opposite the proscenium-arch is the gallery, under which is the main staircase with ante-rooms on each side. The auditorium is covered by an open-timber roof, with hammer-beams and curved braces, while the stage and gallery have roofs of simpler construction. The exterior walls are of brick, with strings, lintels and other work of stone, and all interior walls are of brick, except a few light framed partitions.

In order to shorten the calculations as much as possible, the floor-plan is made extremely simple; the object being merely to illustrate principles. The structure is to stand on piles, driven through made ground to a stratum which, although not possessing great resistance, forms the best foundation within reach; and as it is essential to cut off the piles under the water-line, which is here fifteen feet below the curb, this distance will be the height of the foundation-walls, including the footings. As usual in all buildings, the plan of the upper story determines that of the sub-structure, and the distribution of the weights and thrusts of the proscenium-arch and roof must be the first step toward the laying out of the foundation-plan.

THE ILLUSTRATIONS.

CAPITALS.

WE publish this week a group of capitals, in the hope that so large a collection of executed designs may be of practical use to our readers, even though the series makes no pretension to completeness of classification or thoroughness of compilation. It was our sole object to group together as many capitals of positive merit, irrespective of style, as could conveniently be included within the prescribed space, and though we do not pretend that we have by any means selected the best, we think that few conspicuously inferior ones will be discovered in the group.

SUBURBAN HOUSES FOR W. A. BUTLER, ESQ., AND J. C. BELL, ESQ., YONKERS, N. Y. MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

These houses will be built of Collabaugh brick and terra-cotta. Bay-windows and attic-story, open-timber and shingle-work, costing about $20,000.

COTTAGE FOR F. W. SPRAGUE, ESQ., KENNEBUNKPORT, ME. MESSRS. H. P. CLARK AND I. LEWIS, ARCHITECTS, BOSTON, MASS.

LEGAL NOTES AND CASES.

Fixtures. — Removal of House Built by the Tenant of Trespasser.

THE Supreme Court of Texas, at their present term, in the case of *Henderson vs. Ownby*, decided the question whether or not the tenant of one who had gone upon and taken possession of the land of another, who had erected a house thereon, could remove it when he had notice that the owner had brought an action for the land against his landlord before he had rented the land. It was determined that the house was a fixture and could not be removed.

The tenant, a shoemaker, rented the premises from Towery, and erected thereon a shop. The building was a box house, set on blocks, and was erected under an agreement with Towery that Griener should have the privilege of removing it at pleasure. The suit resulted in a judgment against Towery and wife, and after the judgment was rendered, but before a writ of possession had issued, Griener being about to remove the house, the plaintiff instituted this suit to enjoin him from doing so. The writ of injunction was issued and executed, and afterwards, by virtue of a writ duly issued under their judgment, plaintiffs were placed in possession of the premises. The injunction suit resulted in a dissolution of the injunction, and in a judgment in favor of Griener on a cross bill for damages for the conversion of the house.

Gould, C. J., in delivering the opinion of the court, said: The controlling question in the case is presented by appellants in the following proposition: "Towery and wife being trespassers on the lot could not move, or authorize Griener to move, any house built thereon with notice of appellant's claim and title, built there without appellant's knowledge or consent; and no contract between Towery and Griener would affect or be binding on the owners of the soil." Citing: R. S. art. 4814, par. 1; Ewell on Fixtures, 41–67, 51–65, 66 and 154; *Graham vs. R. R. Co.* 36 Ind. 463; *Whipple vs. Denny*, 8 Col. 37. The counter proposition of appellee is: "Towery and wife, being in lawful possession of the lot, having the lawful right to rent the same and collect the rents, a contract made by them with the tenant, Griener, to the effect that he could place his shoe-shop upon said lot and remove the same at pleasure, authorized and entitled the said Griener to remove the said shop, provided the removal of the same would not injure the freehold; and a recovery of the lot by the appellant, in a suit against Towery and wife, could not affect his right of removal." Citing: *McJunkin vs. Dupree*, 44 Tex., 520; *Hutchins vs. Masterson*, 46 Ib. 551; *Moody vs. Aiken*, 50 Ib.; *Fowler vs. Stoneham*, 6 Ib. 60; *VanNess vs. Pacard*, 2 Pet. 141; *Tiffi vs. Horton*, 52 N. Y., 337; *Eares vs. Estis*, 10 Kan. 314; 2 Kent, side page 343, and note; 1 Washburne on R. P. pp. 20 to 30 and 437; Ewell on Fixtures, pp. 80 to 110.

An examination of the authorities cited shows that none have been produced which can be regarded as going to the point; that one who rents from a defendant, in a pending suit of trespass to try title can claim, as against the plaintiff, any greater right to remove fixtures erected by him for purposes of trade than the defendant himself would have had, had he erected such fixtures after suit brought. On the other hand, in Ewell on Fixtures, it is said: "In order to give effect to the intention of a party not to make an erection a permanent accession to the realty, the person making the improvement must have the right to determine whether or not the erection shall become a part of the realty; and if, as between himself and the owner of the soil, he has no right to erect the same as property separate and distinct from the freehold, an intention to do so, no matter how clearly manifested, is of no avail." Page 41. In the note to this passage, the case of *Huebschmann vs. McHenry*, 29 Mich. 655, is cited, and, although not fully in point, is, we think, authority for appellant's proposition. In that case, the house in question had been erected by a tenant under a lease from a third person, who claimed by virtue of a tax deed, and there was evidence of a usage entitling the tenant, as between himself and his landlord, "to remove structure so erected at any time before the expiration of the lease." The court says: "There may be cases, it is true, between landlord and tenant, and, perhaps, others, when the intention of a tenant erecting a structure to remove it, and the purpose for which it is erected, enter into the question of its character, whether a fixture or not, and from which the tenant's right of removal may be determined; but no such consideration can, as it seems to us, enter into the question, so far as a mere trespasser is concerned, where the nature of the structure is such as is ordinarily intended to improve the land, and to adapt it to the use and enjoyment of the occupant. The entry here was an assertion of title in the soil — if not in the defendant, at

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 8. SATURDAY, NOVEMBER 4, 1882. Volume XII. No. 358.

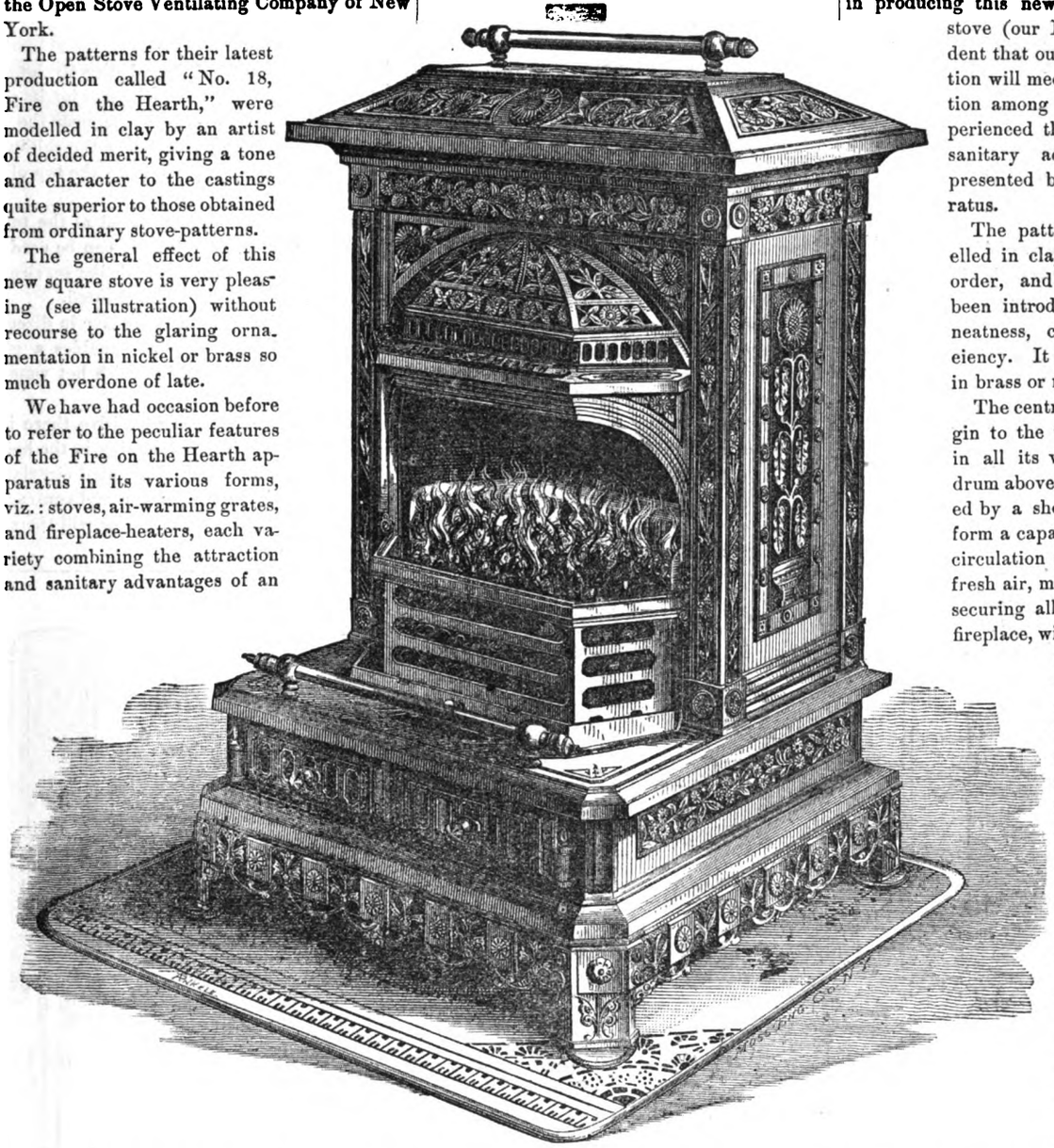
FIRE ON THE HEARTH.

We take pleasure in referring to a significant departure in the line of stove architecture by the Open Stove Ventilating Company of New York.

The patterns for their latest production called "No. 18, Fire on the Hearth," were modelled in clay by an artist of decided merit, giving a tone and character to the castings quite superior to those obtained from ordinary stove-patterns.

The general effect of this new square stove is very pleasing (see illustration) without recourse to the glaring ornamentation in nickel or brass so much overdone of late.

We have had occasion before to refer to the peculiar features of the Fire on the Hearth apparatus in its various forms, viz.: stoves, air-warming grates, and fireplace-heaters, each variety combining the attraction and sanitary advantages of an open fire with the power and economy of an air-warming furnace.



James C. Bayles, the accomplished and expert editor of the *Metal Worker*, says: "The Open Stove Ventilating Company have brought out something exceedingly good in their new 'Fire on the Hearth.' It is richly and appropriately ornamented. Much of the detail is admirable; the effect of the whole is satisfactory, and the stove is a strong heater." We predict a "survival of the fittest."

We have spared neither pains nor expense in producing this new and elegant form of stove (our No. 18), and are confident that our efforts in this direction will meet with hearty recognition among all those who have experienced the superior merits and sanitary advantages heretofore presented by our F. O. H. apparatus.

The patterns have been modelled in clay by an artist of high order, and improvements have been introduced which add to its neatness, convenience and efficiency. It may be trimmed either in brass or nickel.

The central idea which gave origin to the "Fire on the Hearth" in all its varieties, has been the drum above an open fire, surrounded by a shell so constructed as to form a capacious chamber for the circulation of a large quantity of fresh air, moderately warmed, thus securing all the ventilation of a fireplace, with the circulation, comfort and economy of a warm-air furnace, while at the same time, by applying the blowers, the apparatus can instantly be converted into a close heater, adequate for any emergency of temperature.

We herewith give an extract from the *Popular Science Monthly*, undoubted authority on the subject:

"The best contrivance we have seen is the ventilating stove or fireplace known as the 'Fire on the Hearth.' This combines the advantages of a stove within the room to warm by radiation, a grate giving an open fire, which is prized by many, and a passage or chamber open below and above, through which warm air ascends into the room. An opening in the floor with a duct leading to the outside of the house brings in a supply of fresh air which is

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passed through the stove warmed, and streams into the apartment. We have tried this stove and found it satisfactory both as a heater and ventilator. We used one of moderate size, which, as tested by the anemometer, gave from eight to ten thousand cubic feet of air per hour in the room, and thus secured excellent ventilation. The difference between an ordinary stove and this ventilating stove in an unoccupied apartment was most marked to all the inmates."

Professor E. L. Youmans (author of Youmans' Chemistry, Household Science, etc., etc., Editor of *Popular Science Monthly*), in speaking of the F. O. H. stove, says:

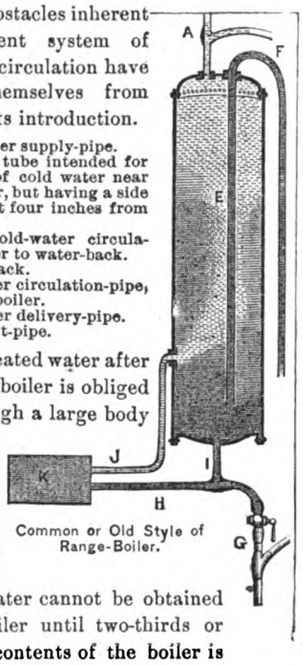
"*It is easy to heat an apartment, but to warm it uniformly by an inexpensive contrivance that secures at the same time an abundant supply of fresh air, is a desideratum that has not, as I am aware of, been previously attained.*

"Being specially constructed to promote an active circulation of air in the room, *it secures the equalization of temperature by this means in an unusual degree.*"

OPEN STOVE VENTILATING CO.,
76 Beekman St., New York.

A NEW RANGE-BOILER CIRCULATION.

Serious obstacles inherent in the present system of range-boiler circulation have presented themselves from the date of its introduction.



Common or Old Style of Range-Boiler.

F. — Cold-water supply-pipe.
E. — Interior tube intended for the discharge of cold water near bottom of boiler, but having a side hole in it, about four inches from top of boiler.
I and H. — Cold-water circulation-pipes, boiler to water-back.
K. — Water-back.
J. — Hot-water circulation-pipe, water-back to boiler.
A. — Hot-water delivery-pipe.
G. — Sediment-pipe.

1st. The heated water after entering the boiler is obliged to pass through a large body of cold water before reaching its appropriate place at the top of the boiler.

2d. Hot water cannot be obtained from the boiler until two-thirds or more of the contents of the boiler is heated.

3d. The circulation is not positive in direction or rapid in action, as it often reverses.

4th. Reversals of circulation are highly detrimental to a boiler; the sudden expansion and contraction of the boiler-shell soon causes it to leak, and tends to its rapid destruction.

5th. The orifice in the interior tube, about four inches from the top of the boiler, is intended to prevent siphonage of the water, whereas it is the prime cause of collapse in copper boilers, acting similarly to a jet condenser, — cold water being forced suddenly through the orifice into a body of steam, condensing it, creating a vacuum, and consequent collapse.

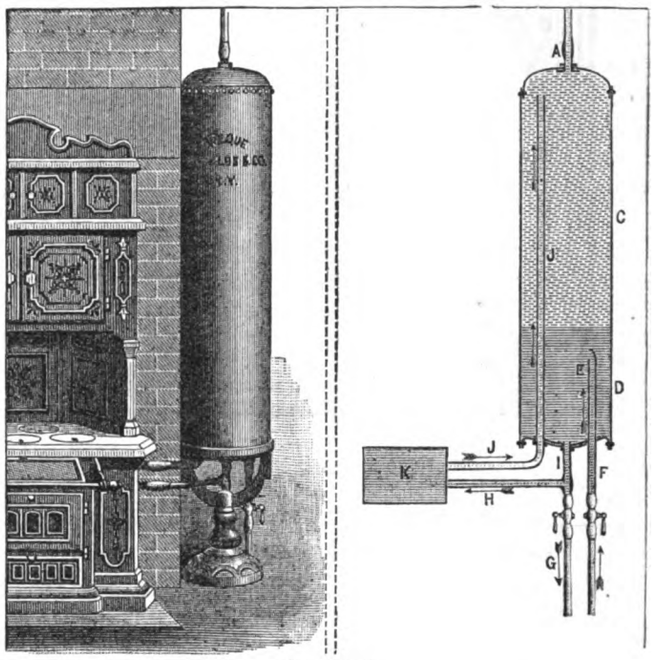
Creque's patented New Circulation Range-Boilers, manufactured by Messrs. Creque, Ronalds & Co., of New York, obviate these difficulties.

The principles involved in their new system are extremely simple, as may be observed in accompanying diagrams. Cold water is supplied at the bottom of the boiler, while hot water is injected into the top of the boiler.

This system of circulation has never reversed its action; the hot-water circulation-pipe being connected with the distributing-pipe in some styles, in others placed adjacent thereto, hot water can be drawn as soon as the water-back is heated. The hottest water will be always the first to be drawn, whether it is from the water-back or the boiler.

The following are some of the advantages claimed:

1st. Delivery of cold water at the *bottom* of the boiler, without chilling the heated water at the top of the boiler.



Style No. 2.

2d. Hot water is injected directly into the *top* of the boiler, the proper place for its accumulation, instead of at the side, near the bottom of the boiler, thus avoiding the chilling of the hot water in its passage to the top of the boiler.

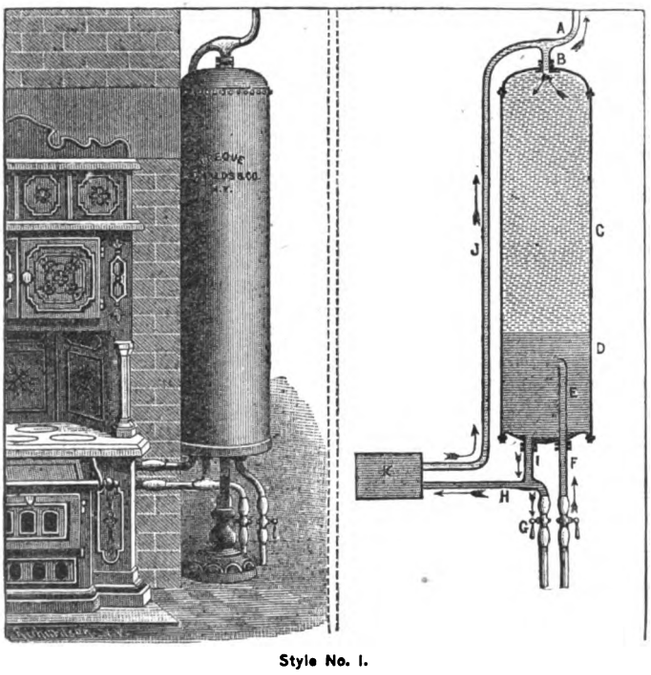
3d. Hot water being stored at the top of the boiler without chilling, it can be used immediately; thus making the boiler serviceable as soon as the water-back is heated.

4th. The circulation is positive in direction and rapid in action, which enables a given water-back to fill a boiler with hot water in very much less time.

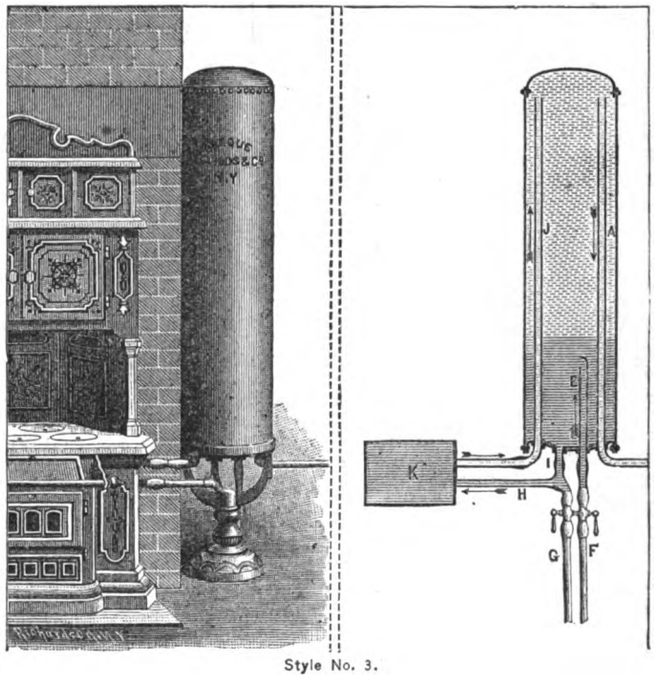
5th. Circulation being positive, there is no cracking, snapping or rumbling in the boiler.

6th. There being no reversal of circulation, there is no sudden expansion and contraction of the boiler-shell. The boiler will therefore wear longer.

7th. In case of a part of the boiler being filled with steam, a sudden injection of cold



Style No. 1.



Style No. 3.

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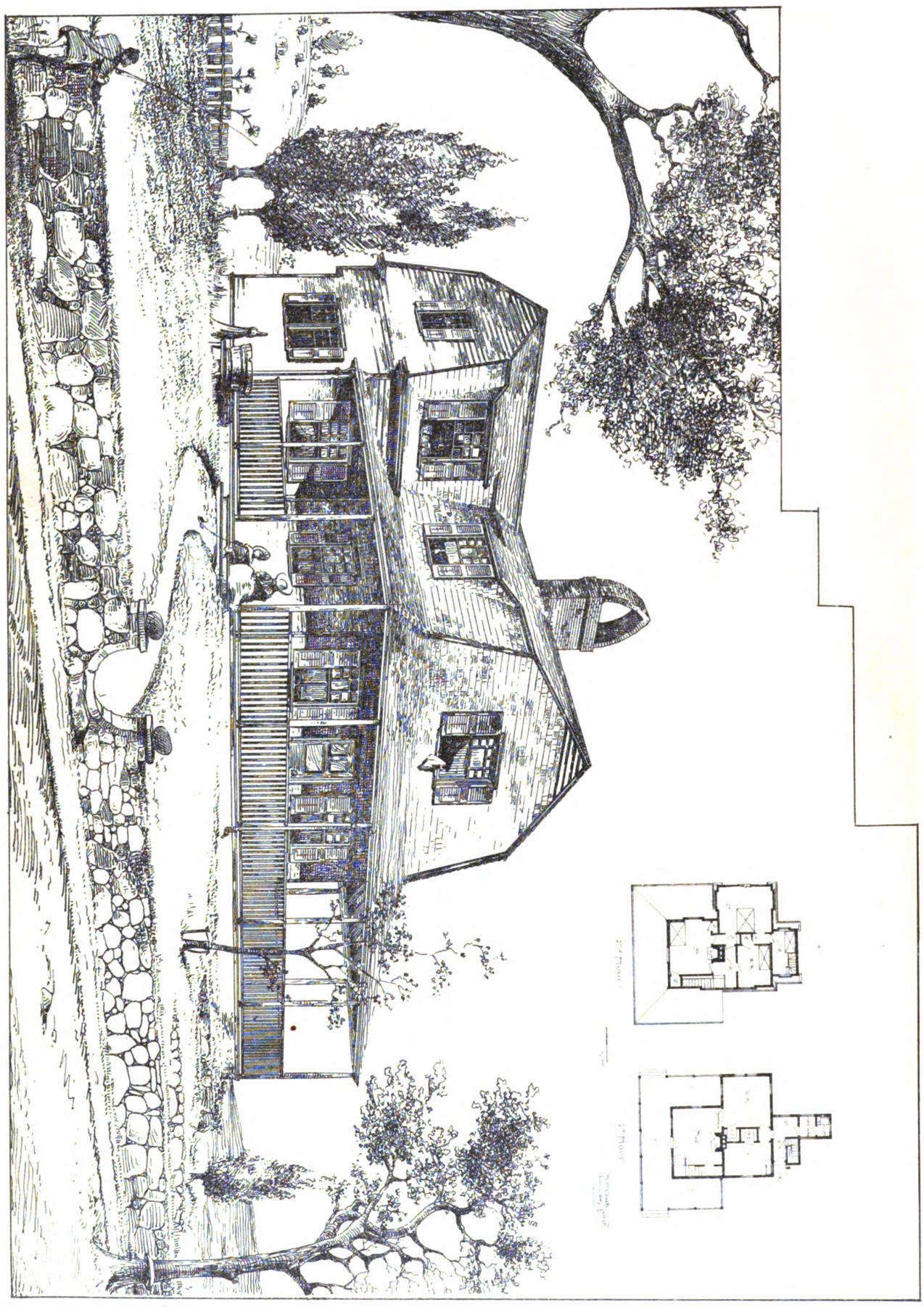

COTTAGE FOR F. W. SPRAGUE ESQ., KENNEBUNKPORT, MAINE.

H. P. Clark, Ion Lewis, Archts., Boston, Mass.

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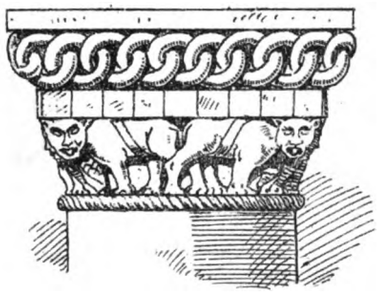
From the
Church of St Demetrius Thessalonica.

(Texier & Pullans Byzantine Architecture.)

Nave Capital
Church at Ratisbonne
Germany.



(King's Study Book of
Medieval Arch. and Art.)

From St. Albans Abbey Church.

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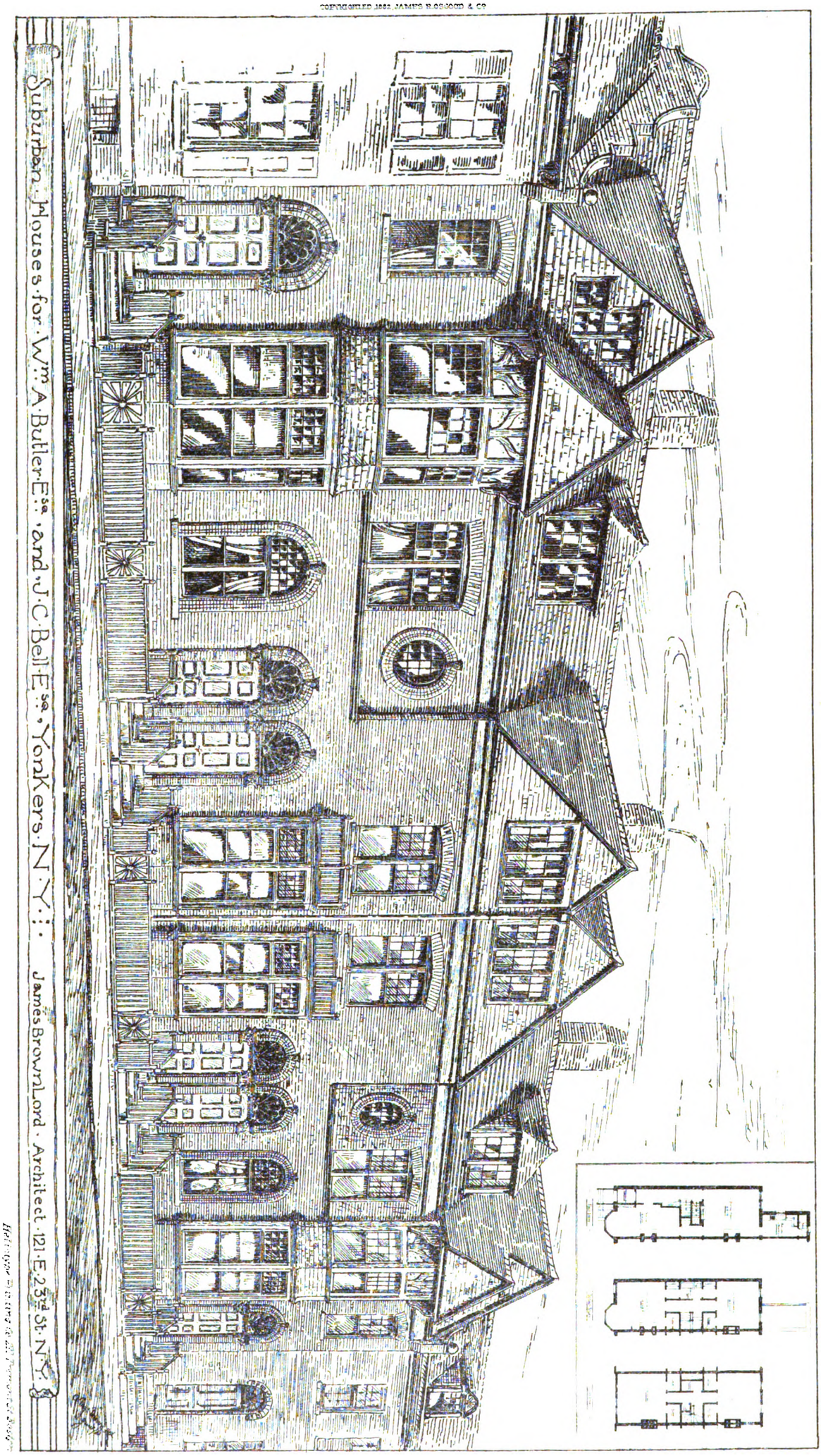

Suburban Houses for Wm. A. Butler Esq. and J. C. Bell Esq. Yonkers N.Y.

James Brown Lord, Architect, 121 E. 23rd St. N.Y.

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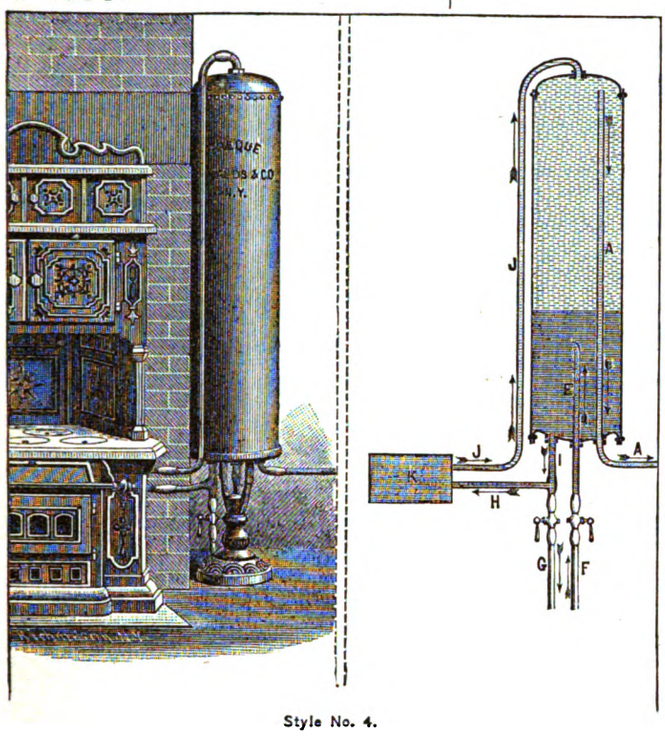
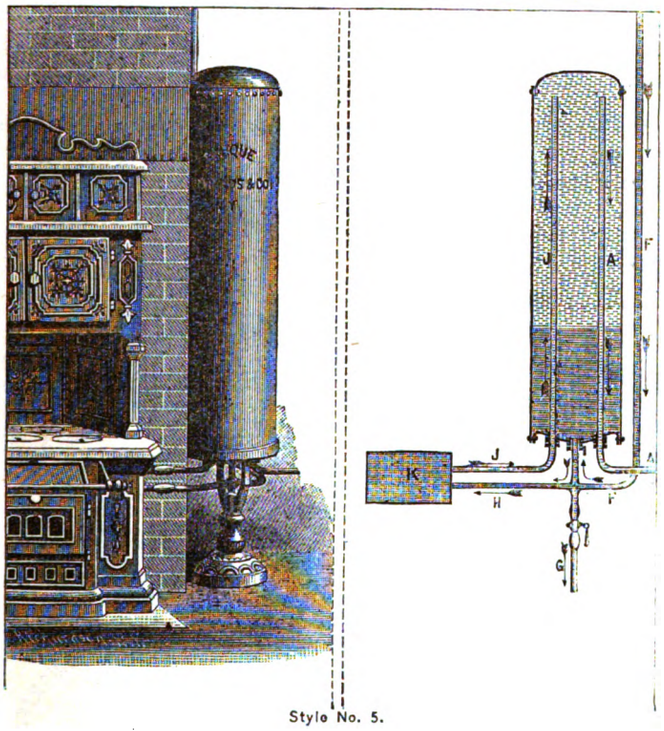
water does not condense it, as the cold water supply is at the *bottom* of the boiler, thus forcing the heated water above it to fill the space left by escaping steam, when a hot-water cock is opened.

8th. A considerable saving in material and labor in cost of setting up the boiler and connecting pipes.



Style No. 4.

9th. The circulation being rapid in its action, the boiler is not liable to scale, hence it will last longer.



Style No. 5.

10th. Less care and trouble need be exercised in setting the boiler, as a variation in the level, (either above or below the water-back,) of the circulation-pipes connecting boiler with the water-back, does not interfere in the least with the circulation, or cause the boiler to snap and rumble, as in the old style of boilers. This very desirable feature will be welcomed and appreciated by all plumbers.

Unlike the old style of boiler, Creque's circulation has been arranged, by various styles of boilers, to meet every conceivable requirement of location or condition. To both the plumber and architect this is a great advantage, while it also lessens the cost to the builder.

These boilers have been in constant use for the past year, and have fully demonstrated all that is claimed for them.

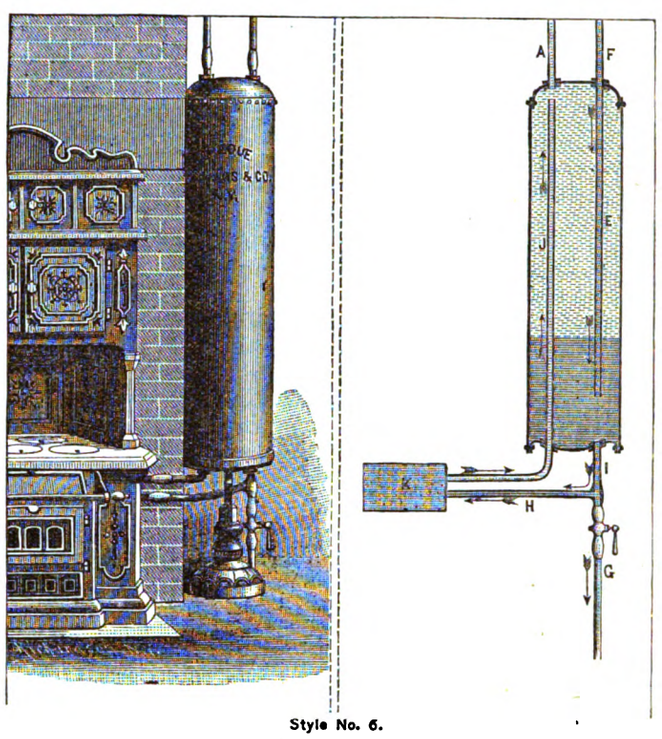
Boiler No. 1 is more especially designed for situations where the hot water is to be delivered on floors above the boiler. It has only three connections; two located in the bottom, one at the top.

F. — Cold-water supply-pipe.
E. — Interior tube for the prevention of siphonage.
H. — Cold-water circulation-pipe from bottom of boiler to water-back.
K. — Water-back.
J. — Hot-water circulation-pipe, from water-back to top of boiler.
B. — The connection device, for injection of the water into boiler, and discharge of hot water from boiler into hot-water delivery-pipe *A*.
A. — Hot-water delivery-pipe.
G. — Sediment-pipe.

Boiler No. 2 is designed for situations where no piping is desired about the boiler sides, and where the hot water is to be delivered on floors above the boiler. It has three connections at bottom and one in top.

F. — Cold-water supply-pipe.
E. — Interior tube for the prevention of siphonage.
H. — Cold-water circulation-pipe from boiler to water-back.
K. — Water-back.
J. — Hot-water circulation-pipe from water-back to interior of boiler, at the top.
A. — Hot-water delivery-pipe.
G. — Sediment-pipe.

Boiler No. 3 has four connections, all located at the bottom.



Style No. 6.

F. — Cold-water supply-pipe.
E. — Interior tube for the prevention of siphonage.
H. — Cold-water circulation-pipe from bottom of boiler to water-back.
K. — Water-back.
J. — Hot-water circulation-pipe from water-back to interior of boiler at the top.
A. — Hot-water delivery-pipe from interior of boiler at top to discharge-orifice.
G. — Sediment-pipe.

Boiler No. 4 has four connections; three at the bottom and one at the top, and is intended for use in French flats or apartment-houses, where the hot water is to be used on same floor with the boiler.

F. — Cold-water supply-pipe.
E. — Interior tube for the prevention of siphonage.
H. — Cold-water circulation-pipe from bottom of boiler to water-back.
K. — Water-back.
J. — Hot-water circulation-pipe, from water-back to top of boiler.
A. — Hot-water delivery-pipe from interior of boiler at top to point of discharge.
G. — Sediment-pipe.

Boiler No. 5. This style is especially designed for buildings having a tank-supply, and where the hot water is to be used on same floor with the boiler. It has three connections, all located in the bottom.

F. — Cold-water supply-pipe discharging into cold-water circulation-pipes *I* and *H*.
I. — Cold-water circulation-pipe, connecting cold-water supply-pipe *F* with boiler; also connecting boiler with cold-water circulation-pipe *H*, and connecting boiler with sediment-pipe *G*.
H. — Cold-water circulation-pipe connecting cold-water supply-pipe *F* and cold-water circulating-pipe *I* to water-back.
J. — Hot-water circulation-pipe from water-back to interior of boiler at top.
A. — Hot-water delivery-pipe from interior of boiler at top to point of discharge.
G. — Sediment-pipe.

Boiler No. 6. This style is adapted for buildings using a tank-supply; it has two connections in both its top and bottom.

F. — Cold-water supply-pipe, discharging into bottom of boiler.
H. — Cold-water circulation-pipe from boiler to water-back.
K. — Water-back.
J. — Hot-water circulation-pipe from water-back to interior of boiler at top.

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A.—Hot-air delivery-pipe.
G.—Sediment-pipe.

In the old style of circulation, the larger the boiler the longer the time it required before hot water could be drawn. For instance, in a 30-gallon boiler 20 gallons of cold water had to be heated before hot water could be drawn. In a 60-gallon boiler 40 gallons had to be heated first. In Creque's New Circulation, no matter what the size of the boiler may be, hot water is supplied as fast as the water-back can generate it.

At a very thorough test of these boilers, lately made by some experts in New York, an air-trap of ten inches diameter was inserted in pipe *J* on boiler No. 1 near the water-back, and within three minutes from the time of starting the fire the circulation had commenced, and remained positive and uniform throughout the balance of the trial.

We have unlimited confidence in our new boiler, and furnish a printed guaranty with all sales, warranting the material, workmanship, economy of setting up, and satisfactory circulation and service.

CREQUE, RONALDS & CO.,
54 Cliff St., New York.

Contracts for all of the iron railings which are to be used on the approaches to the New York and Brooklyn Bridge, specify the "Composite Iron Railings," and are awarded to the Composite Iron Works Company, of New York. These railings are made by joining wrought-iron rods at their intersection with ornaments of chilled-iron, making a perfect union, which is impervious to moisture and consequent oxidization. The shrinkage of the chilled metal serves to hold all the parts firmly in place, and each panel is like one welded piece of work.

We hope that Messrs. Bissell & Co., of Pittsburgh, will soon enable us to lay before our readers an illustrated description of their "Peerless Grates," and the method of setting them.

BUILDING INTELLIGENCE.

General Notes.

Allston, Mass.—Mr. E. A. P. Newcomb is the architect of a house for H. S. Richardson, Esq., measuring 45′ x 80′. It will be a frame building, costing about $12,000; C. W. Bowers, builder.

Burlington, N. J.—House for F. S. Carter, to be of frame and brick; cost, $75,000; Geo. Hewitt, architect, Philadelphia.

Swampscott, Mass.—Mr. J. P. T. Edwards will build at the junction of Atlantic Avenue and Orient St., a cottage costing about $7,000; Mr. S. J. F. Thayer, architect, Boston.

Stony Point, N. Y.—Cottage for Geo. S. Allison; cost, $4,500; architect, H. G. Knapp, of New York.

Thomasville, Ga.—Three-st'y brick house; J. L. Finn, owner; Bruce & Morgan, architects.

Talbot Co., Md.—Three-st'y frame cottage for Chas. Windsor; cost, $6,000; Wyatt & Sperry, architects.

Waterloo, Ia.—The Building Association have under way a block of nine two-st'y brick residences, each, 20′ x 50′; F. D. Heycle, architect, Dubuque, Ia., furnished the plans.

PROPOSALS.

River and Harbor Improvements.

United States Engineer Office,
Portland, Me., October 22, 1882.

Proposals in duplicate, addressed to the undersigned, will be received at his office in Portland, Maine, until 2.30 P. M., on Tuesday, the 7th day of November, for improving the following named rivers and harbors, viz.:

1. *Newburyport Harbor, Mass.*—About 15,000 tons of *rubble-stone* for the southern jetty at Plumb Island, and the construction of a *dike* about 700 feet in length across "the basin."
2. *Lamprey River, New Hampshire.*—About 13,000 cubic yards of *dredging*.
3. *Cathance River, Maine.*—About 13,000 cubic yards of *dredging*.
4. *Moose-a-bec Bar, at Jonesport, Maine.*—About 25,000 cubic yards of *dredging*.

Persons desiring to make proposals for any of the above works, are requested to apply to the undersigned, at his office, No. 453½ Congress St., Portland, Me., for specifications, instructions to bidders, and the requisite blanks, and such further information as may be desired concerning the same.

GEO. THOM, Colonel of Engineers,
358 Bvt. Brig. General, U. S. A.

Low-Pressure Steam-Heating Apparatus. [At Boston, Mass.]

Office of Supervising Architect,
Treasury Department,
Washington, D. C., October 25, 1882.

Sealed proposals will be received at this office until 12 M., on the 22d day of November, 1882, for supplying and fixing in place the low-pressure steam-heating apparatus required for the post-office and sub-treasury extension at Boston, Mass., in accordance with drawings and specification. Copy of specification and any additional information may be had on application at this office or the office of the superintendent, where the drawings may be seen.

JAS. G. HILL,
359 Supervising Architect.

PROPOSALS.

Wrought-Iron Beams and Other Iron. [At Rock Island, Ill.]

Rock Island Arsenal, Ill., October 7, 1882.

Sealed proposals are invited to deliver on board cars at this Arsenal the following wrought-iron beams and other iron:

About 700 tons of 15-inch, 12-inch, 9 or 10½ inch and 4-inch wrought-iron beams; 35 tons of 7-inch deck-beams; 16,000 lbs. of 6-inch channel-bars, 22½ lbs.; 15,000 lbs. T-iron; 6,000 lbs. angle brackets; 16,000 lbs. flat iron, various sizes.

Full bills of and specifications for the iron and forms for bids can be obtained from the undersigned.

The successful bidder must enter into contract and give good and sufficient bonds for a faithful performance of the same.

The contractor can have until April 1, 1883, for the delivery of the iron.

Bids should be addressed to the undersigned and be endorsed "Proposals for Beams." Bids will be opened at 10, A. M., November 8, 1882. Bidders are invited to be present. The United States reserves the right to reject any and all bids.

D. W. FLAGLER,
358 Lt.-Col. of Ordnance, Commanding.

Sea Wall. [New York Harbor.]

U. S. Engineer Office, Room 59 Army Building,
Corner Houston and Greene Sts.,
New York City, October 10, 1882.

Sealed proposals, in duplicate, will be received at this office till 12 M., Wednesday, November 22, 1882, for furnishing materials and labor for the construction of a granite sea wall on Governor's Island, New York Harbor. Appropriation, $39,000.

For information, blank forms, etc., apply at this office.

G. L. GILLESPIE,
359 Major of Engineers.

Bridge. [At Kansas City, Mo.]

Sealed proposals will be received by the undersigned at his office, 509 Delaware Street, up to noon, on Wednesday, the 15th day of November, 1882, for furnishing all of the materials and doing all of the work necessary for constructing and erecting all of sub-structure and superstructure of a wrought-iron bridge and two wooden approaches over Big Blue River on the line of Blue Ave. Bridge to be 140′ long to centres, to contain 24′ in the clear for roadways, and head-room 22′, the wooden approaches to be 24′ wide in the clear for roadway, the eastern approach to be 60′ and the western approach to be 30′ long; trusses to have parallel cords and inclined end posts, and be proportioned to carry live load of 70 pounds to the square foot.

Specifications for the sub-structure can be furnished on application.

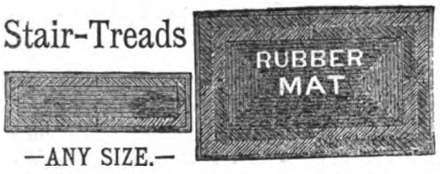
All proposals to be accompanied by plans of structure proposed, showing size, weight and details, together with strain, etc.

Bidders will state when they will commence to deliver the materials on the ground, and the time they will require to finish the structure.

The right is reserved to reject any or all bids of interest to the county.

DANIEL O'FLAHERTY,
358 *Ex-Officio* County Bridge Commissioner.

VULCANIZED RUBBER
CORRUGATED MATTING
For Halls, Floors, Stone and Iron Stairways, Etc., Etc.
Aside from freedom from noise when trodden on, it is of incalculable value in winter for iron and stone stairways in safety to life and limb.



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least in the party under whom he entered. It was an entry with intention to hold an adverse possession. In pursuance of such entry and assertion of title, and with such intention, the house was erected to be used in connection with the land, and as a part of it, or part of the tenant's estate and interest in it. The case had, therefore, every element which characterizes the act of a trespasser who annexes his structure to the freehold, and is, therefore, presumed to intend to change the nature of his chattel and convert it into realty, and thereby give it to the holder of the permanent title, in case he should be subsequently evicted by such holder. In such case it seems clear that no proof of previous intention on the part of the wrong-doer to remove or sever the structure from the freehold should be admitted, for the purpose of changing its character from real to that of personal property, as between him and the actual owner of the soil." A defendant in trespass to try title who makes improvements pending the suit, does so at the peril of losing those improvements should the suit be determined against him, no matter what may have been his intention in regard to their removal. This is so, although the premises may have been sequestered and replevied by him. By replevying he is simply enabled to retain possession, notwithstanding the sequestration. His rights to hold and improve are no greater than they were before sequestration, but after suit. Having himself no right to remove fixtures wrongfully annexed by him to the land of another after suit brought, it is not perceived how, by contract, he can give such right to a third party, having notice of the pending suit. After suit brought he is no longer allowed any greater right to claim that he acts in good faith in continuing to place fixtures on the land, than would be accorded to a mere trespasser; nor can he thereafter, by renting the premises, secure to himself, through a tenant, any greater rights, in regard to such fixtures, than he would otherwise have. These views are conclusive of the case, and must lead to a reversal of the judgment. H. E.

CONCRETE FLOORS.

IN an article which appeared in the *Building News* some short time since, regret was expressed that but little information of a reliable character could be obtained by architects as to the construction and capabilities of concrete floors of ordinary construction, and that no data existed from which any calculations of cost and strength were available. Possibly, if such data did exist, the use of concrete as a floor material for dwellings — except, perhaps, of the humblest class, might eventually become more general. The usual description of wood floor, with a flimsy lath-and-plaster ceiling beneath, is bad from all points of view, and has no redeeming feature. It occupies a considerable amount of space, averaging at least five per cent of the whole cubical contents of most buildings. It affords a safe harbor of refuge under the boarding for rats and mice; provides a sanctuary in the cracks and crevices of the floor-boards for an innumerable and undefinable collection of insects; and becomes a receptacle for the dust and dirt of generations.

The damage and destruction of valuable carpets and upholstery in rooms but occasionally occupied is, to a very great extent, due to the fact that, no matter how much care is taken to exterminate moths, they have an infallible retreat in the gaping joints that appear to be inevitable in most floors.

The extended use of linoleum and kamptulicon has been the cause of dry-rot in thousands of buildings, and, in fact, when once these materials are glued to wood floors, as is often the case, the fate of the latter is sealed, unless free ventilation is obtainable between the floor-boards and ceiling, and this is rarely practicable. The cost of renewal and the danger existing from rapidly decaying — or totally decayed — floor-timbers, are not the only evils, for living and sleeping contiguous to wood undergoing the process of dry-rot is not to be recommended from a sanitary point of view.

Assuming that wood floors and lath-and-plaster ceilings had been unknown till now, and concrete had been the material in general use from time immemorial, any individual attempt to introduce the former, with a view of supplanting the latter, would certainly have been considered as evidence of insanity, and in crowded towns and cities the very fact of introducing a large amount of combustible material, spread over the whole area of buildings, in layers every few yards in height, would have created general feelings of alarm. But wood floors will, from prejudice and custom, continue the rule, and concrete floors the exception, until the use of the former in any closely inhabited neighborhood is prohibited, and, till then, we may look forward to no very great change in — next to the walls and roof — the principal constructional feature in a building.

Did any great difficulty exist in making floors of concrete, and rendering them as comfortable as wood floors (if, under the circumstances described, they can be considered as comfortable) there might be some little excuse for not travelling out of a groove we have been accustomed to for so many centuries.

But there is nothing of the sort. It is true the "data" for calculations and "tables of strength" are wanting; but, at a very moderate cost, these might be obtained, and the R. I. B. A. might spend money worse than in making experiments to obtain the "missing link," and placing its members in possession of facts and figures which would enable them to bridge any void with concrete and iron, without waste of materials and space. The objections urged against the use of concrete for floors in large towns—that special workmen are needed, that the aggregate for such a purpose is not readily attainable, that a cement floor is cold and unhealthy, and that no economical way is known of supplanting cement by any substance more congenial to our acquired tastes for wood floors — are all fallacious and misleading. Special workmen are not required. Concrete flooring, where proper materials and a clear plan and specifications are provided, is as easily accomplished under the supervision of a good clerk of works as any other description of flooring.

For an aggregate nothing is better, all points considered, than coke and coke-breeze, which are procurable in almost any town. Coke is light, free from admixture of an injurious character, cheap, undeniably fire-proof, and Portland cement, as a matrix, suits it to perfection. Portland cement is not cold compared with stone. Granted, it is colder than wood; but its dry nature renders it, when covered with a thin carpet, by no means uncomfortable. Certainly, it is not damp, and it is by many degrees healthier and more wholesome to live upon than a wood floor.

But a concrete floor can be made even more comfortable than a boarded one by floating over its entire surface with a thin coat of neat cement, and, upon this, glueing linoleum to form an unyielding — though slightly elastic and perfectly level — surface, upon which to lay a carpet. It must be apparent to every one that a carpet upon a surface of this kind would be far more durable than when laid upon a boarded floor with uneven joints and sharp ridges. Linoleum is apt to shrink after being laid down some time. This can be remedied, however, by laying it upon the floor face downwards for a week or so, as the canvas back, by exposure to the air, shrinks to its natural size.

Messrs. Eberhard & Co., of Hampstead-road, have invented a glue that firmly secures parquetry to concrete, so that parquetry is another material which can be applied without trouble. In this case, of course, cost must be a secondary consideration. A parquetry border, however, 18 inches or 2 feet wide to large-sized rooms, and linoleum glued down over the remainder of the floor as a pad or foundation for a carpet, would leave nothing further to be desired in the way of appearance and comfort, and fairly lay claim to the title *par excellence* of a "sanitary floor" fit for a mansion, and producible at a moderate cost. For supports of concrete floors rolled iron girders are, no doubt, cheaper and better than anything else, and as in any building 10 feet between supports is a safe span for a flat slab of concrete 5 or 6 inches thick, but very few girders really are needed for the floors of any dwelling, and to clothe that portion that must unavoidably appear below the ceiling, by means of concrete, which can be moulded into any required form *in situ*, and after the girders are in position, is a process of no difficulty whatever. No great gain is obtained by "arching" concrete floors, although, where a flat ceiling is not an absolute necessity, some material can be saved by adopting a segmental form, without any corresponding loss of strength.

Obviously, also, a diminution of the dead-weight of concrete renders smaller iron girders available. I find that half an inch rise in every foot of the chord-line of an arched-form floor insures an equal distribution of strength. Thus, for a floor 10 feet between bearings (the concrete composed of about five parts of aggregate to one part of Portland cement), 5 inches thick in the centre, and 7½ inches at the haunches, or springing, would be the correct proportion. The theory that the expansion and contraction of concrete must, in floors, exercise a prejudicial effect upon the external walls will not, I think, be found correct — at least, no deviation from the perpendicular has taken place in the external walls of a building 100 feet in length, erected some years since, and having a continuous concrete floor throughout its entire length, and this should be taken as a satisfactory test. It is a mistake to think that if ordinary care is exercised a concrete floor may collapse without any warning, or without any assignable cause, and, if subjected to any violent shock, without any signs of elasticity. The sudden collapse, a few years since, of a concrete floor at Portsmouth, causing the death of a workman beneath, was clearly from gross carelessness, and the downfall of a concrete roof at Cambridge in 1878 arose from causes which would apply to the erection of any building.

Perhaps the most interesting experiments in connection with concrete as a floor material were made by Mr. E. A. Bernays, M. Inst. C. E., some years ago. These experiments are the most useful, because similar materials might be procured in any neighborhood, and the experiments were conducted free from any suspicion of partisanship or exaggeration.

A concrete floor 16 inches thick, measuring 16′ 6″ x 17′ 6″, out to out, and 13′ 6″ x 14′ 6″ in clear (no intermediate iron girder being employed), was made with one part Portland cement, and four parts broken bricks, the latter broken to pass through an inch mesh; the concrete well beaten in place and covered with water for seven days. At the end of twenty-one days a party of eighty soldiers

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marched onto it, marked time at quick and double, then jumped, but with no result. It was then loaded with bricks piled over the whole of the unsupported surface, and broke under a weight of 10½ tons, or 1.07 cwt. per superficial foot. With a concrete floor 15′ x 13′ 6″ in clear of all supports, made in a similar manner, and the same age as the one previously described, an experiment was made by dropping a weight of 4 cwt. from a height of 4 feet on the centre of the floor, with the result of breaking a hole clean through; but no radiating cracks appeared, nor was the remaining portion of the floor injured. The superficial area of the weight as it fell is not given. But Portland cement is now manufactured 25 to 50 per cent better quality than was used for these experiments, and better results would, therefore, be obtained at the present time; and it must be remembered that at twenty-one days old a concrete floor has attained possibly 50 per cent only of its ultimate strength, so that, at any rate, there is sufficient evidence to prove that a concrete floor may be made of simple materials, by ordinary workmen, and to occupy about one-half the space necessary for a wood floor capable of carrying the same load.

As an instance of the accumulative strength of concrete floors, another of Mr. Bernays' experiments is given as follows: Size of floor 9′ 9″ x 17′ 6″, out to out, and 6′ 9″ x 14′ 6″ between supports, or 98 superficial feet in the clear, supported on an 18-inch wall all round. Composition of concrete: — One, Portland cement, four, broken brick ballast, gauged to half an inch mesh, and well beaten and covered with water for seven days. At the end of seven days it was loaded by piling layers of bricks over the whole of the unsupported surface, and the result is described as follows: — "When loaded with about 11 tons, or 2.22 cwt. per superficial foot, exclusive of its own weight, the edges of the slab began to rise along the long sides. When loaded with 15 tons, or 3.06 cwt. per superficial foot, it suddenly gave way."

A floor similar in all respects and conditions, except that the trial was made after an interval of twenty-one days, instead of seven, gave the following result: — "Covered with forty-five men on unsupported portion. Marked time at quick and double, and jumped together; afterwards loaded with bricks as before. No result from men jumping. Began to bend with 15 tons, or 3.06 cwt. per superficial foot, rising off outside edges. With 32 tons, or 6.52 cwt. per superficial foot, it cracked slightly; was then loaded up to 43½ tons, or 8.88 cwt. per superficial foot, without appearance of cracks altering. It had tilted up about ¾ inch at outer edges." No further trial being made, the result was not determined. The fact that this floor received 11½ tons additional weight, after giving warning of possible rupture, and then remained unbroken, proves that with sound construction, a sudden collapse is not a positive certainty. But these experiments go to prove that clear spans of about 14 feet, without help from iron in any form, are practicable, and that unlimited areas, with the assistance of rolled iron beams, may be constructed by ordinary workmen, and which shall be fire-proof, burglar-proof, and water-proof; their durability co-equal with the walls that support them; 50 per cent of cubic space saved when compared with wood floors; solid throughout; and not, therefore, permanent dust-bins and traps for offensive matter of every description; perfect as far as sanitation is considered; and, if recognized as a portion of a builder's business, not as a specialty needing special remuneration, as cheap in construction as the primitive method of making floors, the object of which appears to be principally to afford the next generation of builders a considerable item in all their estimates for repairs, "for re-instating and replacing decayed floor-timbers, furring up where the floors are uneven, and laying new floor-boards." — *Thomas Potter, in the Building News.*

THE STRENGTH OF QUARRY STONES.

THE issue of the *Builder* for July 22 called attention to a theory which has been propounded by Herr Müller of Magdeburg, according to which the strength of quarry stones is in direct proportion to their specific gravity.

A detailed criticism of Herr Müller's statements has since appeared, in which Dr. Böhme of Berlin takes up the position that the principles on which this theory rests are erroneous. He denies that any fixed rule can be applied to the settlement of the question at issue, in view of the differences which are known to exist in the various particles of which quarry stones are composed, and also in view of the varied character of the influences to which these stones have been subject in the process of their formation. With a compression spreading over a long period and gradually increasing in power, greater strength must, he considers, be attained than by the action of a sudden and violent force, the molecules having an opportunity in the former case of becoming thoroughly knit together.

The results of the experiments made by Dr. Böhme may be summarized as follows (the strength being shown in pounds per square inch): —

(*a*) Limestone with a specific gravity of 2.68: —

	5 wet samples.	5 dry samples.
Lowest strength	7154.16	7267.95
Highest strength	9984.54	10381.91

(*b*) Limestone with a specific gravity of 2.70: —

	11 wet samples.	11 dry samples.
Lowest strength	8650.22	8050.22
Highest strength	10738.36	12515.80

(*c*) Limestone with a specific gravity of 2.71: —

	6 wet samples.	6 dry samples.
Lowest strength	7196.83	7879.54
Highest strength	12316.72	13668.60

(*d*) Limestone with a specific gravity of 2.72: —

	5 wet samples.	5 dry samples.
Lowest strength	9073.27	9600.50
Highest strength	15033.71	14934.15

(*e*) Sandstone with a specific gravity of 2.54: —

	Wet samples.	Dry samples.
No. 1	12487.40	13668.60
No. 2	15488.80	14607.02

(*f*) Sandstone with a specific gravity of 2.56: —

	Wet samples.	Dry samples.
No. 1	10169.44	9700.10
No. 2	18518.24	18902.37

(*g*) Sandstone with a specific gravity of 2.59:

	Wet samples.	Dry samples.
No. 1	8932.04	9700.10
No. 2	11051.27	11349.56
No. 3	17224.45	16754.40

From these results Dr. Böhme argues that it is impossible to assume that exact connection between specific gravity and strength which Herr Müller claims to have established. Quarry stones are, he remarks, masses of a very heterogeneous character. Their specific gravity is produced by the substances of which they are composed, which are of different specific gravities, while the proportion in which each component substance exists in the bulk is also liable to fluctuations of a more or less important character. He maintains that the strength of the stones principally depends upon the manner in which these various component parts are united. In the detailed consideration of this branch of the subject the various influences to which the stones have been exposed are elements of primary importance.

It is remarked that in porous and relatively light descriptions of limestone the close union of the component particles is sometimes productive of a greater resisting power than is found in other descriptions where great strength might be looked for, but which have been formed with relative quickness and therefore under circumstances unfavorable to their quantities of resistance.

Comparison between stones of Plutonic and those of Neptunian origin is not possible, according to Dr. Böhme, who points out the fact that porous hard lava, which is considerably lighter than sedimentary limestone and sandstone, is usually possessed of greater resisting power than either of these varieties.

Being for the most part a criticism on Herr Müller's theory, there are several points in Dr. Böhme's remarks which invite further debate, and doubtless the attention which has been thus drawn to the subject in German technical circles will lead to its eventual discussion in a complete form. The important divergence in the results of the two series of experiments on limestone would almost seem to point to some differences in the substances experimented upon or in the application of the tests. In the limestone experiments the principle of a simultaneous increase of specific gravity and strength would not seem to be exactly contro erted, but Dr. Böhme's arguments are to some extent borne out by the figures quoted in connection with his tests of sandstone. Doubtless his main intention has been to show the futility of any attempts to arrive at reliable data on the subject, and in this object he seems to have been more or less successful.

THE ELEVATED RAILWAY IN VIENNA.—According to the Vienna *Freie Presse* of October 5, the Austrian capital is to lead the way in the introduction of elevated railways into Europe, the Austrian Government having determined to grant the concession for the Vienna Railway to an English company headed by Mr. Fogerty. The municipality and magistracy of Vienna will, it is said, now have to discuss only the question of technical construction. The line will be concessioned as an elevated railway, and the whole of the iron required for the construction — from 150,000 to 180,000 tons — will be furnished by works in Austria. A contract for the greater portion of this quantity has already been concluded with the Wittkowitz Iron Works. More fortunate than Brooklyn and Westchester, Vienna, though it has a fine system of surface horse-railways, has no Deacon Richardson to lobby in their interests with the "municipality and magistracy" against this great step in metropolitan progress, and no Judge Tracy to help the horse-railway lobby by encouraging litigious and monopolizing citizens to put claims for imaginary consequential damages based on theoretical fees in the use of the streets in the way of rapid transit for the millions. — *New York Tribune.*

A SINGULAR LEASE. — At the Spencer sale of real estate in New York city lately, a piece of property on Crosby street, 75′ x 100′, was disposed of, which, according to the catalogue, was leased "as long as grass grows and water runs, renewable every ten years, at the price of a hundred days' work per lot of an able-bodied laboring-man attending masons, between the first days of May and October, prior to the expiration of ten years."

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A NEW SYSTEM OF LIGHTNING-RODS.

[Translated from *Le Génie Civil.*]

OF all the numerous manifestations of electricity, the most anciently known, as well as the most terrible in its manifestations is lightning. The electric stratum which floats in the atmosphere has from time immemorial reminded men at intervals, by its sudden and violent displays of force, of the existence of a power which still remains but partially understood and controlled.

The first device invented for guarding against the danger of lightning has hardly been improved upon since it was described by Franklin in 1752. The principle remains the same under innumerable variations, and it is only within a few years that the conditions of its action have been made the subject of scientific investigation. Among the latest and most successful experimenters is M. Melsens, member of the Royal Academy of Belgium, whose improved forms of apparatus for the control of atmospheric electricity excited much comment at the recent electrical exhibition, and formed the theme of a discussion at the subsequent Congress of Electricians.

In a system of protection against lightning, M. Melsens said, certain elements were always included: (1) a metallic terminal raised in the air, and consisting of a prismatic bar; a point, sharp or obtuse; a sphere, smooth or covered with points; a star, vane or other form, in any case intended to receive the electricity of the atmosphere and conduct it to some safe outlet; (2) a conductor of metal in the shape of a round or square rod, a ribbon, tube, cord or braid, in direct communication with the earth; and (3) an earth connection of any form, serving to dissipate the current from the conductor in the earth, or into moist soil or water.

Notwithstanding the careful directions published by various scientific bodies as to the proper construction of lightning-rods, accidents have been very frequent, so that the efficacy of any form of conductor is sometimes denied, and M. Melsens, while accepting the general theory of protection, has been led to modify very materially the details of its practical application. In the first place, he multiplies, by numerous ramifications, the ærial point, the conductor and the earth connection, with the object of dividing, as much as possible, the electric discharge; in the second place he interweaves all the conductors, connecting one to another so as to form, all over the building to be protected, a kind of metallic net-work, which is found by experience to be a complete defence. For material he employs copper and galvanized-iron, but principally the latter. Although the conducting power of copper is, for the voltaic current, six times greater than that of iron, there is no such difference in the transmission of atmospheric electricity; on the contrary, the discharge of atmospheric currents is practically the same through copper and iron conductors of equal section. Moreover, the cost of copper is considerable, and conductors made of it offer constant temptation to thieves, so that it is preferable to make the main portion of the rods of iron, with copper tips only.

From the time of Franklin, the accepted form of termination for lightning-rods has been a point; but various modifications of this have been introduced, such as cones, truncated cones, prisms, and even spheres. The area protected by a single rod was formerly supposed to be about equivalent to a circle whose radius is equal to the height of the rod above the ground, and in accordance with this imaginary principle, the points of rods are often raised twenty or thirty feet above the building which they are meant to defend. Investigation into a great number of cases has shown this idea to be quite unfounded. So far as any determination can be made, the empirical rule of Mr. Preece is probably the most accurate which we have; his deduction from observed facts being that a good conductor absolutely protects everything included in a figure limited by a surface of revolution of which the profile is given by a quarter-circle whose radius is equal to the height of the rod, and which is tangent both to the rod at its upper extremity, and to a horizontal plane passing through its base. It is evident that such a figure would fail to include a large portion of most buildings, unless the rod were of inordinate height, and the multiplication of points seems a reasonable mode of meeting the difficulty. In M. Melsen's system a considerable number of points are distributed over the building to be protected, each point being composed of five or six radiating spikes, arranged around a longer one, and projecting at an angle of 45° with the vertical. The short spikes are of copper or galvanized-iron, either cast or in the form of wire. The longer upright one is of copper, and the whole forms a sort of plume at the top of a rod, rising a yard or so above the roof.

Whatever may be the theory of lightning-strokes, the advantage of multiplying the protecting points seems plain. According to Beccaria, the action of the pointed rod converts the electric cloud into one of the ordinary kind, while Professor Colladon finds that just before a discharge the electric stratum bends around and envelopes the object which it strikes, and in either of these cases the multiplication of the metallic tips affords a means of attacking the cloud at many points at once. As a further consequence of these observations, M. Melsens is led to diminish the section of his conductors, and in this he is supported by Mr. Preece, the distinguished English electrician. Instead of rods, he forms conductors of galvanized-iron wire, $\frac{8}{10}$-inch in diameter, which is easy to place in position, is readily bent to follow the contours of the building, and yields without injury to expansion and contraction. The multiplication of conductors renders it practicable to diminish their section to even less than this, actual experiment having shown the dispersion of a single electric discharge among three hundred and ninety conductors, varying in material as well as in size.

The earth connection, as every one knows, is one of the most important elements of a system of protection against lightning, and it is to a defective "earth" that most of the injury inflicted by lightning upon buildings is due. Notwithstanding the unfavorable opinion of certain scientific commissions, the utility of connecting lightning-rods with all the metallic portions of the construction of the building which they protect, particularly with the gas and water pipes, is now generally recognized. In this way the danger of lateral strokes between the conductor and the metal-work of the house is obviated, and numerous examples show the practical value of this arrangement. It is, however, unnecessary to push the principle of uniting all the metal-work of the building to the conductor too far. If the ground connection is such as to assure the dispersion of the current over a large surface of moist earth, small detached portions of metal may often be left isolated from the circuit without danger.

The character of a perfect earth connection is not always understood, and the majority of lightning-conductors are very far from what they should be in this respect. According to Becquerel and Pouillet, the conducting power of iron is to that of water, as a thousand millions to one, and to that of moist earth as four thousand millions to one; so that a lightning-rod of one square centimetre ($\frac{1}{6}$ of an inch) in section would, in order to transmit the stroke which passed through it without check, require to be terminated by a plate of iron two hundred and twenty-five metres (about seven hundred and fifty feet) square, supposing both sides of the plate to be immersed in water; while if merely buried in a wet soil, the terminal plate would need to be four hundred and fifty metres square, or in other words, would have an area of over fifty acres. Of course, such terminals are out of the question in practice, and the most that can be done is to endeavor to approach as near to the theoretical standard as possible, by making connections with gas and water mains, and in other ways augmenting the surface of contact with water and moist soil.

The ground connection of the conductors which protect the Hôtel de Ville at Brussels, in pursuance of this principle, is made through the medium of a well, in which are immersed a cast-iron tube having ten square metres of surface, twenty iron wires each five metres long and twelve millimetres in diameter, and eight large carbon plates. Besides this, connection is made with the gas and water mains.

The cost of protection against lightning has been very considerable, but the improvements in the construction of conductors have reduced their price. A farm-house is described which was furnished with a network of galvanized wire, armed with thirty-six clusters of points, each having six branches, and connected with the ground by eleven earth contacts, of which two were carried to the well, two to a neighboring pond, and the remaining seven to moist earth. The different conductors were connected by nine separate circuits, and the total cost was about four hundred francs.

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HEATING PUBLIC BUILDINGS.

Chicago, Ill., October 25, 1882.

To the Editors of the American Architect:—

Dear Sirs,—Would you be so kind as to inform me through the *American Architect* what kind of heating, air or steam, you would prefer for a public building. Can you name me any books in French, English or German in that line of heating? Can you name me a weekly French journal about the same as yours? H. G.

[Heating by hot-air is generally preferable, but most public buildings are too large or too unfavorably distributed to be so warmed without using several furnaces, which involves much labor. With steam, which can be sent any distance from a single boiler, there is no such difficulty, hence, steam is usually employed for the purpose. Baldwin's "Practical Treatise on Steam-Heating" gives just the information you wish on that branch. "Peclet's Traité de la Chaleur" is the best theoretical work on the whole subject. Putnam's, "The Open Fireplace in all Ages" is also very good and practical in its remarks on ho -air heating. *La Semaine des Constructeurs*, published by Ducher & Cie, Paris, is an excellent journal, probably the best suited to your wants.—Eds. American Architect.]

CONSERVATORIES.

Hamilton, C. W., October 30, 1882.

To the Editors of the American Architect:—

Dear Sirs,—Can you give me the address of any firm that makes conservatories in either wood or iron? I do not see any such advertisement in your paper.

Yours truly, C. W. Mulligan, Architect.

[The only person engaged in this line of business that we know of is Mr. Arthur E. Rendle, 7 Warren St., New York.—Eds. American Architect.]

NOTES AND CLIPPINGS.

North Sea Canal.—One of the most remarkable of the great canal projects now occupying the attention of engineers is that of uniting the North Sea with the Mediterranean. Like most other enterprises of this character, it is old in conception, dating back, it is claimed, to the beginning of the Christian era. Four years ago it took a definite shape in a plan for a canal from Marseilles to Lyons and then to Dunkirk. During the present year a substitute was suggested in the form of a canal from Bordeaux to Narbonne. This latter plan, though possessing great advantages in point of distance, the route being much shorter and less expensive than the other, yet, on the other hand, is less attractive as an enterprise of vast scope, since it would merely connect the Bay of Biscay with the Mediterranean, cutting off the doubling of the Spanish Peninsula. Whichever project is selected, it would be remarkable to find the earth's surface so cut up that a ship may pass from Bombay to St. Petersburg solely through inland waters, as it would be able to do by using the Suez, the French and the Danish canals, the three being designed for the largest commercial vessels.—*Engineering News.*

Tripolith.—Tripolith is the name given by its inventors to a new binding material for builders, a substitute for lime, cement, and plaster under certain circumstances, and which is composed of sulphate of lime, coke, and oxide of iron in some form or other. To test its various qualities, the manufacturers, Messrs. von Schenk Brothers, of Heidelberg, have had a very thorough series of trials carried out with this material by the Imperial German Bureau for Testing Building Materials, and of these tests we give below a summary in tabular form. That the material requires considerably less water to form a workable mortar than ordinary lime is no doubt an advantage, while the time for setting can be admirably regulated by adding more or less ordinary slaked lime. Thus while tripolith mixed with sand only, sets in 10 to 15 minutes, an addition of slaked lime may easily increase the time required for setting to 60 minutes. The specific gravity of tripolith is lower than that of plaster; the former is 1.678, the latter 1.696. Turning now to the tests, we give in our table the mean results in each case of five complete experiments. The extraordinary increase of tensile strength after a long exposure to the atmospheric air is remarkable; it amounts to 100 per cent from seven to ninety days in mortar B, and to 189 per cent in mortar C for the same time. Compared with the tensile strength of lime and cement, the results obtained with tripolith are highly satisfactory. The compression tests point out for tripolith a position between lime mortar and cement mortar, but since after being fairly set it acquires about the same crushing strength as ordinary bricks, no more would be needed for general use. In setting, tripolith mortar loses in weight, and when placed in water does not absorb the latter so rapidly as ordinary mortar does. Its adhesion to brick, stone, and other materials is very considerable, and the tripolith mortar does not either reduce or increase noticeably in volume when setting. For facing and plastering, this material is excellently suited; it is easily handled and smoothed while soft, adheres well to brick or stone surfaces, and attains far greater hardness than plaster-of-Paris, and oil or other colors adhere to it well.—*Engineering.*

Hammers.—To most persons a hammer is simply a hammer, but every mechanic knows that there is a great variety of hammers, from the tiny lump of steel with which the watch-maker taps the mandril of a balance-wheel to the huge trip-hammer under which tons of hot iron are moulded into shape. The hammer, in fact, plays an important part in the mechanic arts, each one presenting its peculiar form, size, weight and material. In some trades there is great skill and dexterity required in the use of the hammer. Any one who has seen the operation of riveting a boiler has admired the sleight of hand with which the strikers round up the head of a rivet in less time than it takes to write about it. The blows follow one another with wonderful accuracy and rapidity, and when the rivet-head is finished it looks as smooth and regular as if it had been cast in a burnished mould. Take even the process of driving an ordinary nail and it is remarkable what a difference there is in the method of a novice and that of a carpenter. The one hits one side, often bends or breaks the nail, or bruises the finger that holds it. The carpenter hits with precision and drives the nail home with well-directed blows. The deft hammering of coppersmiths is proverbial, pounding metal into any required shape. The copper plates that are used by engravers are hammered hard in long strips by the use of large steel hammers with faces as smooth as that of a mirror. The most accurate hitting is required in this process, because the hammer-face is flat and must be held perfectly level to avoid cutting deep gashes in the plates. When it is necessary to make bevels on these plates, a skilled workman will make a bevel with a hammer in a few minutes that would require hours if made by filing and polishing. Silversmiths learn to be very expert in the use of the hammer. Spectacle-makers can take the temples of a pair of ladies' spectacles and temper them by dexterous planishing between hammer and anvil. A blacksmith always has an assortment of hammers with which to shape the ductile iron. File-cutters are required to use hammers with great judgment. Each tooth in a hand-made file is made by the burr raised by tapping a sharp chisel held to the soft file. After each blow the chisel is set up against the burr of the last stroke and another burr is raised, and so on until the file is finished. The force of the blow measures the size of the burr raised, so that the regularity of the file depends upon the evenness of the hammer-stroke. Many files are made by transferring processes by machinery, but the hand-made files command the highest price, while with many peculiar forms of files the hand-work is indispensable, and the regularity of hammer-work a necessity. One of the most difficult jobs to be done with a hammer is to straighten large flat plates of metal. An expert workman will here do, with a few strokes of the hammer well directed, work that a non-expert cannot do at all. Indeed, without great skill the attempt to straighten plates with a hammer generally results in making the crookedness worse. The gold-beater's hammer is wielded day by day by the trained hand, although an hour of it would fatigue the novice. The calker has a peculiar long hammer. The axe and the adze are but sharpened hammers. Machinists use great copper hammers for work where they wish to strike blows without marring the object struck. Among the queerest hammers in use is a magnetic hammer. There was once a Yankee peddler who used one of these to great advantage. He was peddling a fancy soap. He would go into a store, pull out his advertising-card, "Buy my unequalled soap," and before the astonished store-keeper could remonstrate he would tack up one of his cards on a rafter or wall where it could not be taken down without a step-ladder. The way he did it was to hold up his card to the required spot with one outstretched arm, standing on tiptoe. He had a magnetized hammer with a long handle, and in his mouth a few tacks. He put one tack on the hammer, point outward, and with one tap sunk it into the required place to secure his card out of reach. Recently, in South Brooklyn, a tall bill-poster pursued this plan of posting advertisement-cards on telegraph-poles so high that it required the line-men to climb up the poles to get the cards down.—*New York Sun.*

Luminous Paint.—A cheap luminous paint, it is said, may be produced by thoroughly cleaning oyster-shells with warm water, putting them into the fire for an hour, and at the end of that time taking them out and letting them cool. When quite cool they should be pulverized finely, and the gray parts removed, as they are of no use. The powder so obtained is put into a crucible in alternate layers with flour of sulphur. The lid is then put on the crucible and then cemented in place with sand made into a stiff paste with beer. When perfectly dry the crucible is put over a fire and baked for about an hour, and, after having cooled, the lid is again opened, when the mass within should be perfectly white. A sifter is then made by taking a pot and putting a piece of very fine muslin very loosely across it and tying it with a string. The powder is put into the top and raked about until only the coarse particles remain. The very fine powder contained in the pot is then mixed into a fine paint, with gum-water, and the article to be made luminous is supplied with two coats of this paint. The fluid should be rather thin, since two thin applications are said to give better results than one thick one. The article coated with this paint will remain luminous for a considerable length of time, provided it has been exposed to the light during the day.—*Exchange.*

TABLE SHOWING RESULTS OF TESTS OF TRIPOLITH MORTAR.

	Composition by weight.	Water required for Mortar.	Rise of Temperature.	Mixture set.	Test pieces.											
					Water required for Moulding.	Specific Gravity.	Tensile Test. Breaking Load, pounds per square inch			Compression Test. (Loads in pounds per square inch).					
										Cracked	Crushed	Cracked	Crushed	Cracked	Crushed
		per ct.	deg. F.	minutes.	per ct.		7 days.	28 days.	90 days.	7 days.		28 days.		90 days.	
A	Tripolith pure,	60	4.7	10 to 13	58	1.678	170	270	335	705	985	740	985	1035	1295
B	1 tripolith, 1 fine sand,	27	44.6	15	22	2.228	188	320	375	760	930	1114	1410	1370	1610
C	1 tripolith, 1 fine sand, 1 slaked lime	50	43.	30 to 35	42	1.817	86	160	245	245	495	300	460	630	280
D	1 tripolith, 2 coarse sand,	21	44.6	10	17	2.817	150	255	295	535	730	1040	1225	1215	1395
E	1 tripolith, 1 slaked lime,	90	46.	50 to 90	87	1.615	43	77	150	110	230	205	320	455	570

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

266,267. AIR-PURIFIER. — Peter Breen, Cincinnati, Ohio.

266,276. SCREW-NAIL. — Henry Dunham, Abington, Mass.

266,309. WATER-CLOSET. — Charles F. Pike, Philadelphia, Pa.

266,310. COMBINED WRENCH, VISE, AND NAIL-PULLER. — Daniel R. Porter, Cambridgeport, Mass.

266,384. DEVICE FOR CLOSING WINDOWS AND DOORS. — Doyel Pearson, Memphis, Tenn.

266,385. SAW-SET AND CLAMP. — John W. Petty and James K. Petty, Omaha, Neb.

266,388. LATCH. — Augustus B. Prouty, Worcester, Mass.

266,389. LOCKING-LATCH. — Augustus B. Prouty, Worcester, Mass.

266,390. LOCK. — Augustus B. Prouty, Worcester, Mass.

266,393. HEATING-STOVE. — Ewald Schöneberg, Bockenheim, Germany.

266,404. WATER-CLOSET AND URINAL. — George E. Waring, Jr., Newport, R. I.

266,416. PNEUMATIC APPARATUS FOR REMOVING NIGHT-SOIL FROM CESSPOOLS. — Jean Baptiste Berlier, Paris, France.

266,433. VENTILATING PIPE AND COWL. — John Cooper, Boston, Mass.

266,434. SUPPLY-TANK FOR WATER-CLOSETS. — John Cooper, Boston, Mass.

266,474. VISE. — Marvin T. Henson, Pratt, O.

266,479. SAFETY-STOP FOR ELEVATORS. — John Johnston, New York, N. Y.

266,485. WASTE OR SEWER-TRAP. — Colin Lightbody, Brooklyn, N. Y.

266,498. DOOR AND SHUTTER BOLT. — Robert B. Monroe, Philadelphia, Pa.

266,502. FIRE-ESCAPE. — Allen Newhall, Brooklyn, N. Y.

266,506. STEAM-HEATING APPARATUS. — Eugene F. Osborne, St. Paul, Minn.

266,507. STAINED-GLASS WINDOW. — Eugene Oudinot, Paris, France.

266,508. ORNAMENTING GLASS FOR ARCHITECTURAL PURPOSES. — Eugene Oudinot, Paris, France.

266,516. APPARATUS FOR TREATING TIMBER WITH ANTISEPTICS. — Joseph W. Putnam, New Orleans, La.

266,519. CARPENTER'S PLOUGH. — Frank A. Rappleye, Kendaia, N. Y.

266,522-523. VISE. — Henry F. Read, Brooklyn, N. Y.

266,546. VENTILATION. — Marshall B. Stafford, New York, N. Y.

266,556. TRY-SQUARE. — Justus A. Traut, New Britain, Conn.

266,562. MANUFACTURE OF TILES. — Lewis J. Walker, East Liverpool, O.

266,570. FIRE-ESCAPE. — John B. Wickersham, Philadelphia, Pa.

266,579. AUTOMATIC FIRE EXTINGUISHER AND ALARM. — Charles E. Buell, New Haven, Conn.

266,595. SCREW AND PIPE WRENCH. — William J. Owen, Nashville, Tenn.

266,596. FIRE-ESCAPE. — John Travers, Albany, N. Y.

10,223 (*Reissue*). METALLIC SHUTTER. — George Hayes, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

CHURCH. — Messrs. Wm. Ferguson & Bro. have been awarded contract for building Faith Presbyterian Church, at a cost of $43,000.

WAREHOUSE. — Four-st'y and basement warehouse, 38' x 93', for W. G. Primrose, Clay St., between Park Ave. and Howard St., brick, stone trimmings; cost, $15,000; Wm. Ferguson & Bro., architects and builders.

BUILDING PERMITS. — Since our last report twenty-four permits have been granted, the more important of which are the following: —

Geo. C. Hershman, 5 two-st'y brick buildings, s w cor. Essex and Concord Sts.

Wm. Jones, two-st'y brick building, in rear of n w cor. Bank St. and Madeira Alley.

Mary A. Smith, two-st'y brick building, w s Haubert St., s of Nicholson St.

Lancaster Ould, two-st'y brick building, Garden St., between Madison and Biddle Sts.

Gantz & Ameg, 12 two-st'y brick buildings, Chew St., between Wolf and Durham Sts.

E. D. Onion, three-st'y brick building, s s Warren Ave., e of Battery Ave.

Jas. C. Fenhagen, two-st'y brick building, Alice-Anne St., between Washington and Chester Sts.

Mrs. A. Schmidt, two-st'y brick building, Booth St., between Amity and Schroeder Sts.

Henry Kontner, two-st'y brick building, Boyd St., s s, e of Callender Alley.

Boston.

BUILDING PERMITS. — *Brick.* — *London St., No.* 61, Ward 2, for Rev. J. J. Williams, two-st'y and mansard dwell., 43' 4" x 45' 4" and 50' 4"; ell, 17' 4" x 27' 10"; Jas. Devine, builder.

Columbus Ave., Nos. 157-167, Ward 11, for Franklin L. Fay, six-st'y flat mercantile, 80' x 99' 4"; M. S. & G. N. Miller, builders.

Marlborough St., No. 441, Ward 11, for Samuel T Ames, three-st'y mansard dwell., 23' x 58'; Samuel T. Ames, builder.

Wood. — Neponset Ave., near Commercial St., Ward 24, for Mary A. Vance, one-st'y pitch dwell., 20' 6" x 27' 2"; H. P. Oakman, builder.

Hamblen St., near Arlington Ave., Ward 4, for Whittemore, Woodbury & Co., one-st'y, flat manufactory for wax, 28' x 25'; Geo. M. Starbird, builder.

Dorchester Ave., near Creek St., Ward 24, for Patrick Harb, one-st'y pitch stable, 40' x 100'; one-st'y, flat storage of wagons, 16' x 135'; one-st'y flat storage of wagons, 16' x 120'.

A St., rear, near Congress St., Ward 13, for Wm. H. Dole, two-st'y flat stable, 50' x 64'.

Swett St., rear of, near Magazine St., Ward 20, for Masten & Wells, one-st'y flat storage of fireworks, 15' x 45'; Maxwell.

Shurtleff Court, near Rutherford Ave., Ward 4, for Reed Bros. & Sawin, two-st'y flat stable, 40' x 64'; 2 ells, 40' x 44'.

Gage's Wharf, near Water St., No. 89, Ward 5, for Addison, Gage & Co., one-st'y pitch storage of ice-packing materials, 129' x 129'; N. C. Mulliken builder.

Savin St., near Tupelo St., Ward 21, for Wm. Barton, two-st'y pitch dwell., 17' 3" and 20' 6" x 31' 6"; ell, 15' x 18'; Wm. Barton, builder.

Savin St., near Tupelo St., Ward 21, two-st'y pitch dwell., 22' x 31' 6"; ell, 13' x 18'; Wm. Barton, builder.

Terrace St., rear, near Heath St., Ward 22, for Boston Car Spring Co., one-st'y flat manufacturing building, 21' x 60'; T. Merriman, builder.

Sumner St., near Webster St., Ward 2, for Patrick Haynes, two-st'y and mansard dwell., 19' 6" x 34'.

Pratt St., near Linden St., Ward 25, for Isaac Pratt, Jr., one-st'y pitch dwell., 20' and 26' x 30'; W. B. Cameron, builder.

Alden Pl., near Green St., Ward 23, for James McMorrow, one-st'y pitch stable, 17' x 24'; James McMorrow, builder.

Spring Lane, near Chestnut St., Ward 23, for F. A. Heerde, two-st'y pitch dwell., 23' x 30'; ell, 19' x 19' Jacob Luippold, builder.

Wales St., near Blue Hill Ave., Ward 24, for Cheever Newhall, two-st'y hip dwell., 20' and 36' x 34' and 41'; Chas. E. Currier, builder.

Fuller St., between Washington St. and Dorchester Ave., Ward 24, for James O'Neil, two-st'y pitch dwell., 23' x 36'.

Unnamed Pl., off Walnut Ave., near Dale St., Ward 21, for Wm. Donaldson, two-st'y pitch dwell., 20' and 23' x 28'; Wm. Donaldson, builder.

Clifford St., No. 19, near Warren St., Ward 21, for Amity B. Davies, two-st'y pitch dwell., 21' x 38'; ell., 14' 6" x 16' 6"; D. Davies & Son, builders.

West Walnut Park, No. 9, rear of, Ward 23, for Rebecca J. Spenceley, one-st'y pitch workshop, 20' x 25'; C. J. Spenceley, builder.

Dorchester Ave., No. 912, cor. Grafton St., Ward 24, for Jas. Nolan, one-st'y pitch store, 15' x 15'; Chas. Stinson & Co., builders.

Culvert St., No. 18, Ward 19, for Wm. H. McIntosh, one-st'y, pitch manufactory, 18' x 25'; W. H. McIntosh, builder.

Brooklyn.

BUILDING PERMITS. — *Wall St., No.* 16, s s, 175' e Broadway, two-st'y frame dwell., tin roof; cost, $3,500; owner and builder, Henry Bossert; architect, Th. Engelhardt.

Lorimer St., w s, 250' s Norman Ave., 5 three-st'y frame tenements, gravel roof; cost, $3,000 each; owner and builder, J. J. Randall, 126 Manhattan Ave.

Vernon Ave., s s, 135' w Tompkins Ave., 5 two-st'y brownstone dwells., tin roof; cost, each, $4,000; owners, J. Clark & Sheridan, 675 Willoughby Ave.

Fulton St., s s, 120' e Grand Ave., 4 four-st'y brownstone stores and flats, tin roofs; cost, each, $8,000; owner and builder, W. H. Aldrich, on premises; architect, R. Dixon.

Clifton Pl., s s, 200' w Nostrand Ave., 3 two-st'y brownstone dwells., tin roofs; cost, each, $4,500; owner, A. Miller, 373 Decatur St.; architect and builder, T. Miller.

Greene St., No. 200, three-st'y frame tenement, gravel roof; cost, $3,000; owner, Wm. H. Marshall; architect, Abram Gamble; builders, Pat. Newman and Post & Gamble.

Norman Ave., n s, 50' e Newell St., 2 three-st'y frame tenements, tin roofs; cost, each, $4,500; owner, John Brodie; architect, Mr. Weber.

Gates Ave., Nos. 425 *and* 427, n s, 185' e Nostrand Ave., four-st'y brick double flat and 2 stores, gravel roof; cost, $20,000; owner, Paul C. Grening, 420 Gates Ave.; architect, Amzi Hill; builder, Jas. A. Thomson.

Meserole St., Nos. 64 *and* 66, four-st'y brick brewery, tin roof; cost, $14,000; owner, Joseph Fallert, 66 Meserole St.; architect, John Platte; builder, John Auer.

Bushwick Ave., s w cor. Ainslie St., 4 three-st'y frame, 1 store and tenement and 3 tenements, tin roofs; cost, $12,000; owner, James Baird, 114 Bushwick Ave.; architect, Geo. Hillenbrand; builder, Val Bruckhauser.

Quincy St., n s, about 250' e Throop Ave., 4 two-st'y brownstone dwells., tin roofs; cost, each, about $4,000; owner, etc.; J. W. Steuart, 952 Lafayette Ave.

Fifteenth St., s s, 126' 11" w Third Ave., 5 three-st'y brick flats, felt and gravel roofs; cost, each, $3,000; owner, James S. Basley, 176 Harrison St.; architect, E. W. Sanford; builders, Van Pelt & Pierce and Leclain & Greer.

Newton Creek, w s, n of Meeker Ave., one-st'y frame shed, felt and gravel roof; cost, $3,900; owners, A. C. Kingsland & Son, 430 Fifth Ave., New York; architect and builder, John H. McCullogh.

Baltic St., s w cor. Fourth Ave., 3 three-st'y brick flats and stores, felt and gravel roof; cost, each, $6,000; owner, J. H. Whooley, Baltic St., near Fourth Ave.; architect, R. Dixon; builder, E. H. Whooley.

Willoughby Ave., s s, 335' w Marcy Ave., three-st'y brownstone dwell., tin roof; cost, about $6,000; owner, etc., S. C. Phillips, 691 Lafayette Ave.

Dupont St., n s, 275' w Oakland St., three-st'y frame tenement, tin roof; cost, $3,500; owner, Maria Moore, 51 Lexington Ave., New York; architect, Albert Lang; mason, S. Van Riper; carpenter, M. Thomas.

Ewen St., No. 178, e s, near Stagg St., three-st'y frame store and tenement, tin roof; cost, $6,000; owner, Geo. Baser, on premises; architect, J. J. Smith; builders, Jacob Rauth and Henry Ochs & Sons.

Seventeenth St., n s, 275' e Sixth Ave., 2 three-st'y brick tenements, tin roof; cost, each, $4,526; owner, Simon J. Harding, 25 Second Pl.; architect, Wm. H. Wirth; builders, George Phillips and Frederick Schroeder.

Greene Ave., s w cor. Throop Ave., 5 two-st'y brownstone dwells., and 1 two-st'y brownstone store and dwell., tin roofs; cost, each, $4,000; owner, etc., Patrick Concannon, 187 Wythe Ave.

Willoughby Ave., s s, 355' w Marcy Ave., 2 two-st'y brownstone dwells., tin roofs; cost, each, about $4,000; owner, etc., S. C. Phillips, 691 Lafayette Ave.

Hancock St., n s, 60' e Nostrand Ave., 2 three-st'y brownstone dwells., tin roofs; cost, each, $4,500; owner, Frederica M. Kinney, 418 Third St.; architects, Parfitt Bros.

Park Ave., Nos. 797 *and* 799, n s, 150' e Throop Ave., 2 three-st'y frame tenements, tin roof; cost, each, $6,000; owner, Olof Nordstrom, on premises; architect, Th. Engelhardt; builders, Geo. Straub and Eich Bros.

Smith St., No. 116, about 75' from Pacific St., four-st'y brick store and tenement, tin roof; cost, $7,500; owner, Mrs. Cath. Gaynor, Warren St.; architect, D. Laub; builders, F. J. Kelly and C. Dietrick.

Broadway, s e cor. Sumner Ave., three-st'y brick store and tenement, tin roof; cost, $8,000; owner, Louis Funk, 626 Broadway; architect, Th. Engelhardt; builders, Wm. Dafeldecker and J. Frisse.

Stuyvesant Ave., w s, 18' s Vernon Ave., two-st'y brick dwell., tin roof; cost, about $8,500; owner, M. Figueira, Flushing Ave.; architect, Fred. E. Lockwood.

Huron St., No. 177, n s, 125' from Manhattan Ave., three-st'y frame tenement, gravel roof; cost, $4,000; owner, Mr. Depold, on premises; architect, F. Weber; builders, J. Newman and Post & Gamble.

St. James Pl., w s, 100' n Lafayette Ave., two-st'y Ohio-stone chapel, slate roof; cost, $45,000; owner, Emanuel Baptist Church; architect, E. L. Roberts; builders, W. & T. Lamb, Jr., and C. L. Johnson.

Hamilton Ave., No. 340, s s, 68' e Garnet St., three-st'y brick tenement, tin roof; cost, $4,220; owner, Jacob Leeman, or Seeman, Poughkeepsie, N. Y.; architect, P. Henry Gilvarry; builders, P. Kelly & Son.

Fulton St., s e cor. Elliott Pl., four-st'y iron store and dwell., tin roof; cost, $28,000; owner, Charles Cheesborough, Northport, L. I.; architect, C. A. Snedeker; builders, T. B. Rutan and E. Snedecker.

Oakland Ave., No. 130, e s, 200' n Norman Ave., three-st'y frame tenement, gravel roof; cost, $3,300; owner, Bernard Shelton, 274 Oakland Ave., architect, A. Gamble; builders, J. Newman and Post & Gamble.

North Sixth St., n w cor. Second St., four-st'y brick tenement, tin roof; cost, $8,500; owner, John McTernan, cor. Columbia and Warren Sts.; architect, Thos. F. Houghton; builders, Matthew Smith and John Fallon.

Johnson Ave., s w cor. Old Bushwick Ave., 2 two-st'y frame stores, tin roof; cost, each, $3,000; owner, Henry A. Smith, on premises; architect, Th. Engelhardt; builders, Ulrich Maurer and M. Metzer.

ALTERATIONS. — *Raymond St., Nos.* 73, 75, *and* 77, *and* 28, 30 *and* 32 *Division St.*, add one-st'y; cost, $4,000; owner, John Lockitt, Raymond St., near Bedford St.; builders, Hartt & Boyd.

Taylor St., s w cor. Kent Ave., four-st'y brick extensions, gravel roof, etc.; cost, $3,400; owner, F. Thill, on premises; architect and carpenter, J. H. Devoe; mason, J. F. Assip.

South Fifth St., s s, 100' w Second St., one and two st'y brick extension, gravel roof; cost, $3,000; owner, Frederick C. Knowles, on premises; architect, E. F. Gaylor; builders, Jno. McQuaid and Jenkins & Gillies.

North Eighth St., between Second and Third Sts., add one st'y, tin roof, present front rebuilt, also interior alterations; cost, $4,600; owner, Chas. Kelbe, cor. Third and North Eighth Sts.; architect, A. Herbert.

Chicago.

BUILDING PERMITS. — Chas. Groat, three-st'y brick flats, 21' x 60', 371 West Wood St.; cost, $3,000.

Aug. Zender, three-st'y brick dwell., 23' x 62, 239 Bissell St.; cost, $5,000.

J. H. Gibson, two-st'y and basement brick dwell., 17' x 50', 3524 Forest Ave.; cost, $3,000.

Thos. Owen, two-st'y and basement brick dwell., 20' x 50', 135 California Ave.; cost, $3,000.

John Schneider, two-st'y and basement brick store and flats, 38' x 56', Wentworth Ave., cor. Twenty-third St.; cost, $6,000.

Sturtevant & Lutz, two-st'y brick dwell., 21' x 48', 117 Jay St.; cost, $2,800.

A. Anderson, three-st'y brick dwell., 21' x 50', 208 West Division St.; cost, $3,000.

William Temple, 2 two-st'y and basement brick dwells., 45' x 50', 95 and 97 Hill St.; cost, $7,000.

E. K. Rodgers, 3 one-st'y brick cottages, 22' x 36' each, 165, 171 and 177 McGregor St.; cost, $3,000.

Cassel, Higbee & Co., 2 two-st'y brick dwells., 37' x 40', 13½ and 15 Diller St.; cost, $4,500.

P. O'Brien, two-st'y brick dwell., 25' x 47', 555 Twenty-sixth St.; cost, $3,400.

E. Fox, two-st'y and attic brick dwell., 21' x 48', 647 South Ashland Ave.; cost, $2,600.

Fred. Zapel, three-st'y brick store and dwell., 25' x 70', Clybourn Ave., near Fullerton St.; cost, $5,000.

John F. Walsh, three-st'y and basement brick dwell., 50' x 78', Nos. 1 and 3 Whiting St.; cost, $14,000.

George Keller, 2 two-st'y and basement brick dwells., 40' x 40', 133 and 135 Dearborn Ave.; cost, $20,000.

J. B. Farley, two-st'y and basement brick dwell., 22' x 56', 271 Bissell St.; cost, $4,500.

Dr. L. A. Ruehl, three-st'y and basement brick

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store and dwell., 24′ x 66′, Ashland Ave., cor. Fifteenth St.; cost, $5,000.

C. Thinger, two-st'y and attic brick dwell., 22′ x 52′, 117 Lincoln Ave.; cost, $4,000.

John Basch, two-st'y and basement brick dwell., 20′ x 60′, 292 Dayton St.; cost, $3,000.

L. Z. Leiter, additional story, 41′ x 144′, 241 and 243 State St.; cost, $12,000.

E. B. Smith, two-st'y brick store and dwell., 25′ x 50′, 3246 Wentworth Ave.; cost, $3,500.

P. J. Sexton, 5 four-st'y brick dwells., 72′ x 162′, 341 to 353 Chicago Ave.; cost, $50,000.

Fannie M. Boone, three-st'y brick dwell., 25′ x 86′, 3033 Michigan Ave.; cost, $10,000.

John Schroeder, two-st'y and basement brick dwell., 24′ x 60′, 634 West Twelfth St.; cost, $4,000.

John Kranz, three-st'y brick dwell., 23′ x 62′, 284 East Huron St.; cost, $10,000.

M. M. Rothschild, three-st'y brick flats, 19′ x 74′, 3200 Prairie Ave.; cost, $10,000.

S. E. Gross, 4 one-st'y brick cottages, 20′ x 30′ each, Illinois Ave., near Thirty-second St.; cost, $4,000.

Chas. Bithke, two-st'y and basement brick store and dwell., 24′ x 70′, Ogden Ave., near Taylor St.; cost, $8,000.

W. L. Moss, two-st'y brick dwell., 32′ x 43′, 739 and 741 Ashland Ave.; cost, $3,000.

Mary Callnan, two-st'y and basement brick dwell., 21′ x 60′, 457 North Ashland Ave.; cost, $4,400.

Livesey Iron Works, four-st'y and basement brick factory, 53′ x 80′, 38 and 40 Quincy St.; cost, $11,000.

Mary Spelina, two-st'y brick dwell., 21′ x 50′, 112 Farquar St.; cost, $4,000.

H. Seekamp, 2 one-st'y brick cottages, 20′ x 50′ each, 463 and 465 Elston Road; cost, $2,500.

L. Morrison, two-st'y and cellar brick dwell., 38′ x 58′, Homan St., cor. Washington St.; cost, $15,000.

Louisa J. Bangs, two-st'y and basement brick dwells., 34′ x 50′, 469 North State St.; cost, $11,000.

M. Jedlika, two-st'y and basement brick dwell., 27′ x 30′, Kossuth St., cor. Portland Ave.; cost, $5,500.

Waclar, Schery, two-st'y brick dwell., 21′ x 60′, 239 Kossuth St.; cost. $3,000.

Josef Seman, two-st'y and basement brick dwell., 20′ x 56′, 391 West Sixteenth St.; cost, $4,000.

F. Conrad, two-st'y and basement brick store and dwell., 24′ x 60′, 931 West Twentieth St.; cost, $4,000.

W. Kreuger, two-st'y brick dwell., 25′ x 60′, Canalport Ave., cor. Twenty-first St.; cost, $5,400.

J. G. Fisher, two-st'y brick dwell., 24′ x 74′, Van Horn St., cor. Ashland Ave.; cost, $3,000.

Jacob Breuner, two-st'y and basement brick dwell., 24′ x 56′, Laflin and Seventeenth St.; cost, $4,000.

B. Oswald, two-st'y brick dwell., 44′ x 63′, Paulina and Fourteenth St.; cost, $6,700.

Toolen & Maloney, two-st'y and basement brick flats, 3622 Dearborn St.; cost, $4,000.

B. F. Fitch, two-st'y brick dwell., 22′ x 50′, 3533 Indiana Ave.; cost, $4,000.

Dr. Clapp, four-st'y and basement brick flats, 20′ x 48′, 40 East Harrison St.; cost, $7,000.

St. Luke's Hospital, four-st'y brick hospital-building, 80′ x 153′, Indiana Ave., cor. Fourteenth St.; cost, $115,000.

Cincinnati.

Building Permits. — During the past week the following building permits have been issued: —

C. Bare, one-st'y frame dwell., Rachael St., cor. Second Ave.; cost, $2,500.

Wm. Franz, two-st'y brick dwell., 86 Calhoun St.; cost, $4,000.

L. E. Steinman, two-st'y brick dwell., Linn St., near Liberty St.; cost, $5,000.

H. Weiman, three-st'y brick dwells., Eighth St., near State Ave.; cost, $6,000.

Six permits for repairs; cost, $2,000.

Total permits to date, 616.

Total cost to date, $1,815,300.

Detroit.

Building Permits. — The following are the more important of the permits granted since our last report:

Brick house, No. 76 Abbott St.; cost, $3,500; Neil McArthur, owner.

Brick house, No. 461 Fourth St.; cost, $4,000; H. W. Holcomb, owner.

Two brick stores, Nos. 141 and 143 Grand River Ave.; cost, $7,000; M. W. Soovel, contractor.

Block of stores, West Woodbridge St.; cost, $40,000; A. Chapoton, Jr., contractor.

Brick warehouse, No. 227 Croghan St.; cost, $4,500; Jacob Burnstein, owner.

Elevator and freight depot, West Woodbridge St.; cost, $350,000; Union Station Co., owners.

Brick warehouse, West Woodbridge St.; cost, $4,000; Belknap & Drake, contractors.

Frame house, No. 420 Fourth St.; cost, $3,500: Stevens & Co., contractors.

Thirteen frame houses, Russell St.; cost, $6,000; J. W. Weber, owner.

Alterations to brick manufactory, No. 70 Lafayette Ave.; cost, $6,500; Mason & Rice, architects.

Brick house, Fourth St.; cost, $4,500; H. W. Holcomb, owner.

Brick house, Woodward Ave.; cost, $15,000; W. G. Vinton & Co., contractors.

Brick house, No. 33 High St., w; cost, $6,500; W. G. Vinton & Co., contractors.

Brick barn, Woodward Ave.; cost, $4,200; Wells Burt, owner.

Two brick stores, Nos. 73 and 75 Grand River Ave.; cost, $4,200; William B. Wesson, owner.

Brick house, East Forrest St.; cost, $4,500; C. W. Shippey, contractor.

Brick dwelling, No. 29 Miami Ave.; cost, $9,000; J. V. Smith, architect.

Brick store and dwell., Second St.; cost, $12,000; Donaldson & Meier, architects.

Double brick house, No. 318 Lafayette Ave.; cost, $8,000; Donaldson & Meier, architects.

Two brick houses, Canfield Ave.; cost, $16,000; A. J. Fair, owner.

Alterations to brick dwell., No. 461 Woodward Ave.; cost, $7,000; A. C. Varney, architect.

Louisville.

Building Permits.—The following building permits have been issued since last report: —

Geo. A. Houghsten, brick dwell.; cost, $3,000.

J. Kloz, frame dwell.; cost, $2,000.

Trinity Church Congregation, brick church; cost, $3,750.

Henry Vouderheide, brick dwell.; cost, $4,500.

Mrs. W. Dunker, brick store; cost, $16,000.

M. Irwin, brick dwell.; cost, $7,000.

James F. Calloway, brick dwell.; cost, $7,500.

Fred Smith, brick dwell.; cost, $2,000.

Baptist Orphan's Home, brick dwell.; cost, $8,000.

W. J. Watkins, brick dwell.; cost, $4,000.

John Bost, brick dwell., cost, $2,000.

Martha J. Hill, brick dwell.; cost, $3,150.

James W. Osborne, brick dwell.; cost, $6,000.

J. M. Atherton, brick dwell.; cost, $20,000.

New York.

Apartment-Houses. — A novelty in co-operative apartment-houses is to be built on Twenty-third St., between Seventh and Eighth Aves. One novel feature will be the size of many of the apartments, which will range from nine to three rooms each. Every apartment will besides this have a bath-room. The smaller apartments will probably be used by bachelors, and married people without children or servants. The building will be of brick, with stone trimmings, eleven stories high, and fire-proof throughout. The entire cost of land and building will probably reach $580,000; Messrs. Hubert Pirsson & Co. are the architects. The same gentlemen are preparing plans for another apartment-house, to be eight stories high, which is to be erected on the south side of One Hundred and Thirtieth St., between Madison and Fifth Aves. The building will be of brick, with stone trimmings, 50′ x 125′, fire-proof throughout, and will cost $300,000.

Mr. Carl Pfeiffer is drawing plans for a large apartment-house, also on the co-operative plan, which is to be built on the corner of Sixty-second St. and Eighth Ave., of brick, stone and terra-cotta, at a cost of about $350,000.

Partnership. — Messrs. Chas. W. Romeyn, Alfred E. Barlow, and A. J. Stever have formed a partnership under the firm style of Charles W. Romeyn & Co.

Contracts. — The contract for building the "Barcelona" apartment-house has been awarded to Mr. Terence Kiernan.

The contract for laying a rock-asphalt sidewalk on Fifty-ninth St., from Eighth Ave. to Fifth Ave., and on Fifth Ave., from Sixtieth St. to Seventy-second St., has been awarded by the Park Commissioners to the New York Mastic Works.

Building Permits. — *Orchard St., No.* 19, three-st'y brick store and dwell., tin roof; cost, $4,000; owner, Marcus Adler, 19 Orchard St.; architect, John Brandt; builders, Wolf & Lochmann.

Greene St., Nos. 37 *to* 43, 3 six-st'y brick (iron front) stores, tin roof; cost, each, $50,000; owner, Alfred Brady, Rossmore Hotel; architect, M. Odell; builder, Wm. B. Pettit.

Broadway, s w cor. Fifty-seventh St., eight-st'y brick and stone apartment-house, slate and tin roof; cost, $300,000; owner, Chas. H. Bliss, 204 East Seventy-second St.; architect, Wm. Schickel.

Sixteenth St., s s, 170′ 6″ w Ave. B, 6 five-st'y brick tenements, tin roof; cost, each, $10,500; owner, Ph. Braender, Ave. B and Eighty-fourth St.; architect, John Brandt.

East Twentieth St., No. 219, five-st'y brick tenement, tin roof; cost, $10,000; owner, Henry Gucker, 183 Second Ave.; architect, F. W. Klemt; builder, J. P. Schweickert.

East Forty-first St., No. 550, five-st'y brick tenement, tin roof; cost, $12,000; owner and builder, Thomas Cockerill, 350 West Thirty-sixth St.; architect, Jas. Stroud.

First Ave., e s, 21′ s One Hundred and Seventh St., four-st'y brick tenement, tin roof; cost, $9,000; owner and builder, John Norton, 1945 Third Ave.; architect, Bart. Walther.

Third Ave., n w cor. One Hundred and Fifteenth St., five-st'y brick tenement, tin roof; cost, $39,000; owner, Samuel A. Purdy, Jr., 51 West Fiftieth St.; architect, G. Robinson, Jr.

Fifth Ave., e s, 25′ 10″ s Sixtieth St., seven-st'y brick, brownstone and terra-cotta store, tin roof; cost, $110,000; owners, Park & Tilford, 117 Broadway; architects, D. & J. Jardine.

Park Ave., e s, 51′ n Seventy-seventh St., 2 five-st'y brownstone tenements, tin roof; cost, each, $25,000; owner and builder, Frank A. Sietz, 332 East Forty-second St.; architect, J. M. Dunn.

Seventy-ninth St., s s, 76′ w Fourth Ave., 4 four-st'y brick and brownstone dwells., tin roof; cost, each, $20,000; owners, Anson Squires, Fourth Ave., cor. Seventy-eighth St., and J. V. S. Woolley, 75 East Seventy-ninth St.; architect, Anson Squires.

Seventy-second St., n s, 300′ e Second Ave., 3 five-st'y brick tenements, tin roof; cost, each, $23,000; owner, Samuel Simmons, 13 Sheriff St.; architect, Chas. Baxter.

Seventy-first St., s s, 100′ w Eastern Boulevard, eight-st'y brick factory, tin roof; cost, $65,000; owner, Edward Leissner, 828 Broadway; architect, Albert Wagner.

One Hundred and Fourteenth St., n s, 146′ 6″ e First Ave., five-st'y brick tenement, tin roof; cost, $15,000; owner and architect, Alfred B. Ogden, 409 East Fifty-third St.; builder, not selected.

East One Hundred and Seventeenth St., Nos. 176 *to* 182, 4 five-st'y brick tenements, tin roof; cost, each, $13,500; owner, John J. Murphy, 66 Second Ave.; architect, G. W. Da Cunha.

One Hundred and Twenty-eighth St., n s, 285 w Fifth Ave., four-st'y brick tenement, tin roof; cost, $14,000; owner and mason, Cowan Keyes, 63 East One Hundred and Twenty-seventh St.; architect, A. T. Wilson.

One Hundred and Twenty-ninth St., n s, 225′ e Seventh Ave., four-st'y brick tenement, four families, tin roof; cost, $18,000; owner, Wm. Fettretch, 124 East Eighty-fourth St.; architects, Cleverdon & Putzel.

Courtland Ave., w s, 59′ 2″ n One Hundred and Fiftieth St., three-st'y frame dwell. and public hall, tin roof; cost, $12,000; owner, the Melrose Turn Verein, Chas. L. Roeder, President, One Hundred and Forty-seventh St., near St. Ann's Ave.; architect, Adolph Pfeiffer.

Alterations. — *Madison Ave., Nos.* 608, 610, 612 *and* 614, n w cor. Fifty-eighth St., add one st'y, also seven-st'y extension, tin roof, etc.; cost, $135,000; owner, Sarah E. L. Taylor, on premises; architects and builders, Chas. Graham & Son.

East Tenth St., No. 469, add two stories; cost, $4,000; owner, Wm. E. Uptegrove; architect, W. Jose; builders, B. Shapter and Guy Culgin.

West Thirty-second St., No. 133, four-st'y brick extension, interior alterations, etc.; cost, $10,000; owner, Frederick Ackerman, 318 President St., Brooklyn; architect, A. Craig; builder, not selected.

Washington St., Nos. 606, 608 *and* 610, two-st'y brick extension, gravel roof; cost, $4,500; lessee, W. H. Kirby, 229 East Twenty-sixth St.; architect, Wm. Graul.

Bond St., No. 49, new mansard and flat roof, and a one-st'y brick extension, also interior alterations and new front; cost, $7,500; owner, New York Free Circulating Library; architect, W. E. Worthen; builders, Wm. McLaughlin and Robert Burgess.

Philadelphia.

Building Permits. — *Olive St., Nos.* 1236 *and* 1238, three-st'y building, 30′ x 71′; C. G. McMullen, owner.

Hope St., w s, n of Somerset St., 2 two-st'y dwells., 18′ x 34′; W. A. M. Fuller, owner.

Fifty-ninth St., cor. Elmwood St., three-st'y dwell., 20′ x 42′; W. W. Bozarth, contractor.

Salmon St., No. 3232, 2 two-st'y dwells., 13′ x 29′; Sebastian Helm.

Germantown Ave., Nos. 1317 *and* 1319, three-st'y addition to factory, 16′ x 30′; McLaughlin & McNamara.

Ninth St., e s, n of Girard Ave., three-st'y factory, 25′ x 56′; J. H. Riter & Co., contractors.

Hamilton St., s s, w of Thirty-third St., 2 three-st'y dwells., 16′ x 68′; Pennock Bros., contractors.

Arch St., No. 224, three-st'y store, 15′ x 52′; Pennock Bros., contractors.

North Fifth St., No. 2637, three-st'y dwell., 18′ x 52′; David Zimmerman.

North Second St., No. 1805, three-st'y dwell., 20′ x 32′; Jno. Cairns, contractor.

Twentieth St., e s, n of Dickerson St., 6 two-st'y dwells., 16′ x 42′; Thos. H. Hay.

Mascher St., e s, s of Oxford St., five-st'y factory, 50′ x 80′; A. B. Rorke, contractor.

Huntingdon St., s s, n s Fox St., between Sepviva and Tulip Sts., 5 two-st'y dwells., 12′ x 28′ and 18′ x 40′; W. H. Greenfield, owner.

Fox St., No. 605, three-st'y dwell., 15′ x 34′; Pauline Wolf, owner.

Thirtieth St., e s, s of Poplar St., 8 two-st'y dwells., 15′ x 26′; W. H. Bilyeu, owner.

Noble St., No. 146, four-st'y factory, 26′ x 66′; Jas. Hood.

Front St., w s, n of Girard Ave., three-st'y dwell., 20′ x 42′; Wildey & Gardy, contractors.

Tioga St., s s, e of Nineteenth St., 6 three-st'y dwells., 20′ x 60′; P. J. Essex & Co.

Fifteenth St., e s, between Reed and Dickinson Sts., 2 three-st'y dwells., 16′ x 50′; W. R. Machett, owner.

Dickinson St., s s, w of Broad St., 5 two-st'y dwells., 15′ x 48′; W. R. Machett, owner.

Walnut St., Nos. 335, 337 *and* 339, six-st'y office-building, 50′ x 106′; Marriner & Buckingham, contractors.

Myrtle St., s e cor. Holly St., 4 three-st'y dwells., 16′ x 44′; Lewis C. Smith, contractor.

Winton St., s s, w of Sixth St., two-st'y dwells., 14′ x 28′; Smith & McHenry, contractors.

Huntingdon St., s s, w of Fourth St. and e of Leithgow St., s of Huntingdon St., 11 three-st'y and two-st'y dwells., and 2 stores, 16′ x 50′; E. J. Devlin, owner.

North Fifth St., No. 2639, two-st'y dwell., 18′ x 50′; E. Schmidt, contractor.

Hancock St., w s, n of Huntingdon St., one-st'y dye-house, 46′ x 66′; Wm. Steel, contractor.

Huntingdon St., n s, between Second and Hancock Sts., two-st'y office, 16′ x 60′; Wm. Steel, contractor.

Hamilton St., s s, e of Eighteenth St., one-st'y shop-building, 30′ x 100′; Baldwin Locomotive Works, owner.

Twenty-seventh St., s w cor. Jefferson St., 6 three-st'y and two-st'y dwells., 14′ x 26′; J. Bryan, contractor.

Manton St., e s, n of Jefferson St., two-st'y dwell., 18′ x 38′; Jos. Hutton.

Shackamaxon St., n w cor. Girard Ave., 4 three-st'y dwells., 18′ x 33′; R. R. Hall, contractor.

Ash St., s e cor. Moyer St., 5 dwells., 1 three-st'y store and 4 two-st'y dwells., 18′ x 38′; J. S. Baldt & Son, contractors.

Haines St., w s, s of Chestnut Hill Railroad, 2 two-st'y dwells., 15′ x 28′; Wm. Kohl & Co., contractors.

Howard St., s s, bet. Norris and Berks Sts., two-st'y dwell., 18′ x 40′; Jas. McCartney, contractor.

Tioga St., n w cor. Smedley St., 3 two-st'y dwells., 13′ x 28′; Benj. Walker, contractor.

Orthodox St., s s, w of Race, (Frankford), two-st'y dwell., 16′ x 30′; Benj. Taylor, contractor.

North Twenty-second St., No. 1705, dwell., 18′ x 27′; A. Hindle, contractor.

C St., e s, n of Cumberland St., and w s Fairhill St., n of Cumberland St., 6 two-st'y dwells., 16′ x 46′; Amos D. Kennedy, owner.

Cambridge St., s s, bet. Carlisle and Fifteenth Sts., 4 three-st'y dwells., 17′ x 40′; Jas. V. McGarvey, contractor.

Diamond St., No. 116, two-st'y stable, 27′ x 50′; Jas. V. McGarvey, contractor.

Taggart St., w s, n of Otis St., two-st'y dwell., 14′ x 30′; Thos. L. Kelley, contractor.

Orkney St., w s, 128′ s of Indiana St., two-st'y stable, 15′ x 40′; Thos. L. Kelley, owner.

Chelton Ave., w of Green St., (Germantown) two st'y dwell., and back building, 22′ x 61′; Chas. Rupp, contractor.

Howard St., cor. of Huntingdon St., 2 three-st'y dwells., 17′ x 45′; Jos. Lougham, owner.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 359.

NOVEMBER 11, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE burning of the Park Theatre in New York has called out much comment, and its rapid destruction after all the effort which has been made in that city to enforce the regulations for the protection of theatres against fire seems rather remarkable. It appears, however, that the apparatus in the theatre might as well have been altogether absent, since it could not be used. The men employed in the building understood their duty, and were quickly at their posts, but they had nothing to work with. There was a system of pipes on the stage, which proved to be out of order at the time of the fire, and according to one account, an automatic fire-extinguisher, which ought by itself to have flooded the building with water, failed to act. For some reason the alarm was slow in reaching the proper station, and all these circumstances concurred in permitting what should have been a trifling blaze to develop into a terrible conflagration. There can be no doubt that a great part of the theatres, not only in New York but in all other large cities, would be found in case of fire to be similarly unprotected. Whether a remedy for this state of things can be found in periodical inspections of fire-extinguishing apparatus, such as is proposed in several newspapers, is very doubtful. To say nothing of the inconvenience of testing such a contrivance as the automatic sprinkler every month or so on the stage, a few years of security would make even the inspection seem burdensome and useless, and it would soon become a mere form. The suggestion of Mr. Esterbrook, the Chief Inspector of Buildings in New York, that the law should oblige all theatres to be built of fire-proof materials throughout, would, if adopted, be the most effectual solution of the problem, but the difficulties in the way are almost insuperable, and the best practical substitute is probably the amendment to the building statutes proposed by Mr. Esterbrook himself last year, which embodies the best modern practice in theatre-building, and would insure a degree of safety infinitely greater than has ever yet been attained in this country.

THREE more fires in theatres have been recorded within a few days, one in Providence, where the Theatre Comique caught fire just before a matinée performance, but was saved by the automatic sprinklers, which extinguished the flames after a part of the scenery had been consumed; and another in New York, where the Alhambra Theatre, a small structure, frequented by a disreputable class of patrons, was completely destroyed by a conflagration which lasted only thirty minutes, from the time of the first alarm until everything within the walls had been swept away. Fortunately, the theatre was unoccupied, and no one was injured. The third fire was in Baltimore, where the Arlington Variety Theatre was partially burned, one person suffocated, and two more injured by jumping from windows and roofs. The fire occurred at three o'clock in the morning, and seems to have originated on the stage.

THE so-called "competition" for the Lincoln monument at Chicago, on which forty thousand dollars of trust money is to be expended, has resulted in the submission of three models, two of which are by sculptors residing abroad, who were paid a certain sum in cash for their trouble, while the third was, as we learn from the Chicago *Tribune*, "sent in at a venture" by a young artist of that city. This last design seems to have attracted the favorable notice of the *Tribune* reporter, who informs us that "although rough and unfinished, it is in many respects the most artistic and desirable of the lot." The sculptor's conception, it appears, presents the great President as a "stout figure," "hardly recalling the tall, gaunt form of Lincoln," with no particular features, since the face is "only indicated," "standing in an easy attitude upon a barrel-shaped pedestal," and "robed in a long, loose coat, thrown back upon the shoulders and falling down in free and easy lines." We might imagine that the artist had offered by mistake a sketch for King Gambrinus instead of the lamented President, were it not for the rest of the description, which informs us that a "spirited and vigorous group of figures surrounds the pedestal and rests upon the base, which tells the story of the Civil War in a distinct and forcible manner." The competing designs, though "very carefully and elaborately finished," do not please the reporter. One of them shows Lincoln as "a very austere and dignified figure," dressed in a "Prince Albert coat," and "polished boots," "balanced very uneasily upon a slender shaft, with one hand resting on a column, over which hangs the drapery of the stars and stripes." The pedestal is embellished with "female figures in bas-relief, typifying War and Peace, Emancipation, Sacrifice, Justice and Education." This description, we must confess, seems to justify the reporter's opinion of the design as "a stiff, conventional idea, very stiffly carried out," and although we hardly like to think of seeing Lincoln represented as standing on a barrel, it is by no means certain that this is not preferable to a pedestal guarded by an assorted collection of meaningless virtues. The third design is said to be very similar to the second, but better as a portrait. What the Bates trustees will do with the models remain to be seen. It is reported that they intend, if they do not like any of them, to throw them all aside, and institute a fresh competition. We imagine the present competitors will have something to say in that event, and that an attempt to get rid of them by any summary process may lead the trustees into trouble, so that we trust one of the models may suit them well enough to be adopted.

THE Telephone Despatch Company of Boston, encouraged by the success of the experimental cable laid last year between two stations on the Old Colony Railroad, has obtained authority for placing underground-wires in all the principal streets of that city, and is now engaged in laying cables of various kinds in the region immediately around its central office. In all cases the cables are enclosed in wrought-iron tubes, four inches in diameter, and buried in concrete, eight tubes being laid side by side in the same trench. The cables, some of which consist of a single wire insulated with paraffine and encased in lead tubing, while others comprise a number of copper wires insulated with rubber and protected with a wrapping of galvanized wire, are drawn through the permanent tubes and can be changed as often as desired. When everything is ready, comparative tests of the cables will be made, and although the officers of the Company do not expect to be able as yet to substitute subterranean for overhead wires, they may gain information which will hasten the time when such substitution may be possible.

A SOMEWHAT noted case, in which the firm of Viti Brothers was compelled to pay a duty of fifty per cent *ad valorem* on certain pieces of statuary imported from Italy, instead of ten per cent, which the importers claimed to be the proper duty, has just been decided against the Government, the judge of the United States Circuit Court holding that the meaning and intention of the law is that all statues, whether originals or copies from antiques, shall be admitted to this country under a duty of ten per cent. This is a decision of very considerable importance, as the Spartan severity with which the collectors of customs generally choose to interpret the statutes regulating the importation of works of art already bids fair to end in totally excluding such vanities unless of native manufacture.

AN interesting book on the Lake-dwellings of Scotland has been recently published by Dr. Robert Munro, who has made a long study of these singular structures. As his investigations show, the artificial islands of Scotland, instead of resting

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on a cluster of piles, like those of the Swiss lakes, had a solid foundation, made by means of a frame or platform of oak logs, which was loaded with stones and earth until it sank to the bottom. Into mortises previously made in the logs of the platform upright posts were then fitted, which were braced in various directions, the process of filling-in continuing until the mass reached the surface of the water. The outer edge was next revetted with a sloping breakwater of logs secured to the rest of the framework, and a platform of logs put over the whole upper surface of the island, which was then ready to build huts upon. In almost every instance a causeway or platform seems to have been built to connect the island with the main-land, but as this would afford access to enemies as well as friends, Dr. Munro conjectures that it may have been constructed below the water-level, so as to form a secret approach in case the canoes of the villagers should be lost or destroyed. As the water-level of most of the Scottish lakes has changed materially since these islands were built, it is impossible to determine how much probability there may be in this supposition, which certainly seems a little strained. Notwithstanding the primitive construction of the lake-dwellings, Dr. Munro thinks that most of them date only to the time of the Roman occupation of Britain, or rather, to the period after the withdrawal of the Roman armies, when the inhabitants of the more peaceful districts, no longer able to defend themselves against the warlike savages of the north, were compelled to seek refuge in habitations fortified after such simple modes. For many years, however, after the tattooed Picts had become tamed into rather unruly citizens, some of the Lowlanders whom their ancestors had so terrified continued to occupy their artificial islands, and a few of them are believed to have been occupied down to the sixteenth century. In Ireland, which was always at least a hundred years behind Britain in civilization, the lake-dwellings or crannogs, built in a manner precisely similar, are known to have been in use at or near the time of the commotions under Charles I. and Cromwell.

Mr. John C. Havemeyer writes from Yonkers to the New York *Times*, describing what he thinks a "simple, inexpensive and complete solution of the problem of keeping sewer-gas out of houses." The "solution" consists, in brief, of establishing in the cellar of the house a tight iron tank large enough to receive the entire drainage of the house for one day, connected to the sewer by a trapped pipe, and vented by a pipe to the outer air. Every day, after the tank is full, the valve connecting it with the sewer is to be opened, and at the same time a cock is to be turned which will admit water from the street mains for flushing. In order to show whether the tank is properly emptied, he proposes to place a float in it, which by means of a chain and dial in some convenient place would indicate the height of the water. This suggestion, which is not entirely new, has a specious air, but it is hardly necessary to point out to those experienced in such affairs that the receiving-tank would form a cesspool within the house, from which gases would arise far more concentrated and offensive than those from an ordinary sewer. To flush it would be practically impossible, and to disinfect it still more so, while it would be perfectly useless in any event, since any soil-pipe or system of pipes which would prevent the vapors from such a tank from issuing into the house would be equally secure against gases from the sewer. It seems rather late in the day to have to repeat that no reservoir whatever of drainage-matter is admissible within a house. To make sure that all decomposable substances shall be swept beyond the walls as quickly and surely as possible is the prime object of modern sanitary science, and with modern sanitary appliances it is practically secured; and the introduction of tanks or reservoirs of any kind on the drainage lines would be a retrograde step which there is no occasion for taking.

During the session of Parliament which has just closed authority was given to various railway companies for expending in the construction of new lines sums which amount in the aggregate to a very large capital. The total estimated cost of the projects authorized in the present year is more than double that for 1881, showing that the fever of railway construction now so prevalent here has its counterpart on the other side of the ocean. Not content with a very large expenditure for stations and other buildings in 1881, the railway companies already in operation asked for and obtained in 1882 authority for building and equipping five hundred and ninety-one miles of new road, at a cost of about thirty-seven million pounds; while new companies were incorporated and authorized to build seven hundred and eighty-nine miles more, at an expense of forty-six million pounds. Taking old and new companies together, the number of miles of railway authorized by the late Parliament is one thousand three hundred and eighty, of which the estimated cost is eighty-two million, six hundred and sixty-two thousand pounds, or about four hundred and ten million dollars. The most expensive new line in proportion to its length is the Regent's Canal, City and Docks Railway, which is to be nineteen miles long, and will cost fifty-two millions of dollars; and the next is a city railway in Glasgow, which will be three miles long, and is to cost nearly four million dollars. One of the most interesting of the new projects is one for an electric railway from Charing Cross to the Waterloo Station of the London and Southwestern Railway Company. This line is to be entirely underground, and will pass from Charing Cross under the new Northumberland Avenue to the River Thames, and by a tunnel under the river to the Waterloo Station, three-quarters of a mile from the starting point.

At the third annual meeting of the American Society of Mechanical Engineers, held in New York last week, the astonishing statement was made that six thousand dangerous defects had been found in steam-boilers in one year, within a district whose extent does not seem to have been specified. If we assume a factor of safety of ten as the ratio between that weakness of a boiler which causes it to be classed as dangerous and that which leads to its actual failure, it would appear that two explosions a day should be the normal rate; but perhaps a larger factor is required in such cases. In regard to such explosions a novel theory has been advanced, the deductions from which have considerable practical value. Every one knows that water, after long boiling, loses its capacity for quiet and steady ebullition, and assumes a violent and intermittent mode of evaporation, the temperature of the water often rising quietly to a point far above the nominal boiling point, and then suddenly falling, with the instantaneous liberation of a considerable volume of steam. This condition, which has not been very satisfactorily explained, undoubtedly exists at the time of many boiler explosions, and it is desirable to find some means of avoiding it. This end may be accomplished, it is found, by restoring to the water the dissolved gas which is eliminated by boiling, and the particles of which seem to form nuclei around which steam-bubbles can form rapidly and quietly. In one form of apparatus air is injected forcibly into the water of the boiler, and serves to maintain a quiet and uniform evaporation, and a chemical substitute for the mechanical addition of permanent gas is said to have been successfully applied by the simple process of placing pieces of zinc in the boiler. This, coming in contact with the iron shell, forms a voltaic pair, the current of which decomposes the water about it, producing free oxygen and hydrogen, which serve, like air, to determine the rapid and steady boiling of the unchanged portion of the water.

Nearly three years ago, in April, 1880, a grant was made by the Commonwealth of Massachusetts to the Boston Public Library of thirty-three thousand square feet of land at the corner of Dartmouth and Boylston Streets, in a very central and conspicuous position, as a site for a new library building, the present one, half a mile or so distant, being now far too restricted in dimensions, as well as inconvenient in plan. The gift was made upon the condition that the work of constructing the new building should be begun within three years from the date of the grant, but hitherto no very serious attempt has been made to raise funds for its erection, and the Boston newspapers are beginning to call attention to the fact that only five months now remain of the period within which operations must be actually commenced, or the land, worth at present prices at least a quarter of a million of dollars, will be forfeited. It is not impossible that the time may be extended by the favor of the State Legislature, but those interested in the library ought hardly to take the risk of losing a property which others stand ready to claim if opportunity offers. So far as we are aware, no steps have been taken even toward the preparation of plans for the new building, and as out-door work will probably be impracticable during at least three out of the ensuing five months, energetic action is needed to prevent disappointment to many persons.

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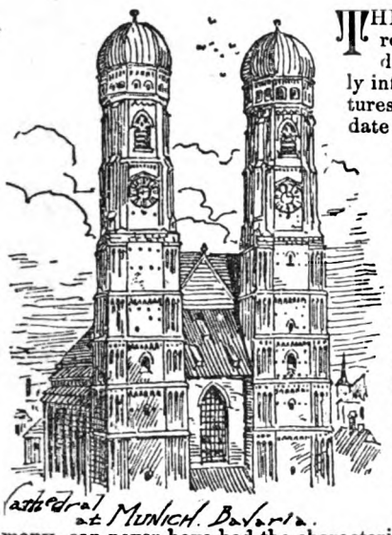
FROM BAYREUTH TO RATISBON. — NOTES OF A HASTY TRIP. — II.



THE chief buildings of Bayreuth — those which give it a distinctive character scarcely influenced by the older structures which of course exist — date from the last century only. There are one or two late Gothic churches which have some points of interest for the professional student, but which are devoid of the picturesqueness that makes such buildings attractive to the general eye: comparatively plain on the outside, large and bare on the inside. Their bareness is due, of course, in great part to modern "restorations;" but buildings like the Magdalena Church of Bayreuth, for example, which abound all through the central parts of Germany, can never have had the characteristics of the best examples of the style. They have never had either perfection of proportion, or beauty of material, or wealth of detail to recommend them. This church was begun in 1483. The elaborate vaulting of the nave is its most interesting feature, and it contains a good Renaissance pulpit supported by a figure of Samson, and a fine font of the same period. The towers were destroyed by fire in the seventeenth century and rebuilt in the heaviest *baroque* style. The chief building of Renaissance days is the old palace, built (1564–1588) by Karl Philipp Dieussart, a stately enough structure with a tower and the busts of the emperors along the façade. Some fine private houses also date from this century. In the eighteenth century the town found its most brilliant period as a princely residence. The Margrave married Wilhelmine of Prussia, the sister of Frederick the Great, and his capital beautified itself to the best of its ability, after the fashion of the day. The new palace, begun in 1753, has three great portals crowned, as are the windows, by broken gables with seated allegorical figures; the interior we had no time to visit. No one stops at Bayreuth for the shortest period, however, without seeing the inside of the old theatre, built in 1747. But few theatres survive intact from so early a day: none in Germany, so far as I know, save one in Munich which dates from about the same time, and is, like this, an example of the most florid Rococo decoration. It is said to be superior to the Bayreuth building, but I could not see it while in Munich, and so can draw no comparisons. If the utmost elaboration of Rococo is suitable for any purpose, it may surely be held suitable for a theatre interior, provided it be, like this one, on a small scale, and destined not to the more serious, but to the lighter of dramatic purposes. The greatest purist could hardly deny that this interior must have looked admirably gay and pretty and appropriate when all its elaborateness was fresh from the hands of wood-carver, painter, and gilder. It is far from fresh to-day, and even in the somewhat dim light that was turned on for our benefit it looked painfully — well, "seedy" is the word that came first to mind. It is not a dignified word, I will allow, but there is nothing either dignified or gloomy or pathetic about the decay of such architectural work as this; it affects one in about the same way as would the half-tattered remains of the powdered wigs and flowered Watteau gowns the fair dames of Bayreuth must have worn on its opening night. It has not been used for many years, and it has not been touched by the decorator's brush, nor apparently by broom or duster, for an equally long period. Naturally its fragile decorations of color and gilding are hopelessly shabby, and the elaborate woodwork of its boxes and balconies is greatly injured; but, as I have said, it must have been immensely pretty in its first perfection. It is very small and exceedingly effective in plan, with a great high *loge* facing the stage, and smaller boxes and projecting galleries at the sides, with little staircases leading down into the parquette, all elaborately carved in wood, and in their diversity very pleasing to the eye after the tamer regularity of the modern play-house: a sumptuous little interior, where a patched and powdered audience must have looked very brilliant and felt itself very cosily at home.

In the immediate neighborhood of the city are the summer palaces, which are also elaborate Rococo buildings, but earlier in time and better in decoration than the theatre. This last was built, as I have said, toward the later years of the Rococo period, and brilliant though it must have been, its decorator's ideas were a little coarse and unimaginative, compared with those of the men who built the *Phantasie* and the *Ermitage*, in the first quarter of the century. In the gardens which go by the latter name is a round "Temple of the Sun," with figures and shell decorations and water-works, that must count among the most cleverly fantastic and Oriental-looking structures of the time. I should add, indeed, that it is only in the interior of the theatre that true Rococo forms are adhered to. In the exterior, as in the exterior of the new palace which I have already mentioned, we find much more sobriety, distinct evidence of the advent of the simpler but more mechanical, less original and less interesting style to which the Germans give the name of *Zopf* — the style which formed the transition between the Rococo of Louis Quinze and the neo-classicism of the period known to us as the "Empire."

The most interesting of the monuments with which Bayreuth is adorned — they are not many — is a group erected at the end of the seventeenth century to the Margrave Christian Ernst. It was the work of one Elias Raentz, and shows, in the theatrical style of the period, which is yet apt to have something grandiose about it even when most convulsed, the mounted figure of the prince riding over the contorted body of a Turk who typifies his eastern enemies. On one side is his favorite court dwarf, and at the corners of the pedestal are symbolical figures of the Four Quarters of the Earth. Such figures are so common in sculpture of this and later periods as to win, most often, little more than a tired, unwilling glance from the passer-by; but our Bayreuth sculptor showed some originality in his allegories. Each figure is accompanied by an animal which seemed to him typical: Europe by an ox, to denote cultivation; nomad Asia by a horse; and savage Africa by a lion, and an American tourist may find himself repaid for a few moments' pause before this extraordinary conglomeration, by seeing that his fatherland was then considered such a fabulous region as to be fitly characterized by a griffin fresh from a fairy tale. One wonders for what beast the artist would see fit to exchange his griffin could he come to life to-day — perhaps for a neat little group of a bull and a bear. The statue to Jean Paul Richter need not detain any one's steps; it is by Schwannthaler, and we shall have enough and more than enough of him when we get to Munich. More interesting and more impressive, as bringing us nearer to the memory of the man, is his tomb in the suburban cemetery; for after living many years in Bayreuth, he died and lies buried there. It is simply a great slanting block of stone, overgrown with ivy and bearing a modest inscription cut upon it — a memorial of so much appropriateness and good taste that one hopes no future Philistine, desiring to do him honor, will ever replace it by some costly monumental futility. This graveyard, by the way, would not be unworth a visit even did it not hold the dust of the "only one." It is crowded and not very well cared for; overrun on this August day with a high growth of golden-rod, a plant I had never seen in the more northern parts of Germany, and which seemed to breathe out a whiff of transatlantic air. One had an impulse to pluck a piece and toss it up to the sculptured America on the square, that she might feel a bit less lonely and homeless with her fantastic griffin. Most of the tombstones were of uninteresting sorts, but among them were some large slabs with good seventeenth-century carvings.

Of course there is no old German town where a student who chose to potter and dig about for a week could not unearth continual objects of interest; but I have, I think, named everything that is of importance in Bayreuth. Nothing remains but that which must, in spite of its architectural simplicity, be the centre of attraction to every traveller — Wagner's new theatre. It has been described so often and so minutely that I may not be justified in even referring to it here. I will only say that nothing could be more perfectly adapted for its purpose — for the purpose of allowing every person in a large audience to enjoy equal rights, to see and hear with equal perfectness, and to sit comfortably at the same time. Though very plain and without the slightest pretension to ornament of any kind, — it is only a temporary structure, we Wagnerites believe — and though built with the greatest possible economy, the effect of the interior is far from unpleasing. Of course one aim of other play-houses, that of "showing off" the audience and producing a brilliant general effect, was not at all planned for; indeed, just the reverse was the case. Most music-lovers will, I think, share with Wagner the idea that this is just what a theatre devoted to serious works ought *not* to do. It ought to be a comfortable place to listen in — not a place to show one's self or to meet one's friends, or to doze in dusky corners. This theatre is simply a great rectangular room, hardly suggesting the time-honored amphitheatre, as the rows of seats curve but very slightly. Each row is raised so that one sees quite over the heads in front, and at the back is a line of boxes devoted to the use of the master himself and his most distinguished guests. The seats expand somewhat toward the rear, the front row being just the width of the stage. The triangular side spaces thus left between the seats and the wall are filled with great Corinthian columns, which are doubled as the space becomes wider toward the stage. If one has a side seat, the eye is led along a vista of these columns until it reaches those which immediately frame the stage, and thus this effect, as of a frame surrounding the picture on the boards is never lost or interfered with. No one accustomed only to ordinary theatres, with their proscenium-boxes and visible orchestra, and over-vivid foot-lights, and gaudy decorations, can quite imagine how much the effect of the scene is enhanced by thus making it the only thing, so to speak, that is in sight. The orchestra is hidden: the hood which curves over the lowered place where it sits meeting (to the eye, though of course not in fact) the line formed by the front of the stage. There is no prompter's box, no mass of unmeaning curtains hanging from above across the proscenium. There is nothing but just the stage itself and then the rows of great columns, neutral in color, which start from either side of it and recede toward the back of the house. The average theatre-goer would not

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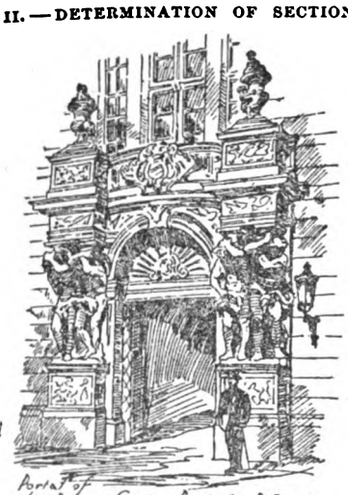
care to spend every evening in such a building; but the true music-lover goes back with regret to the elaboration and disturbing architectural features of other opera-houses.

I trust I shall not be referring to matters of too trivial or ephemeral a nature to be fitly spoken of in an architectural journal if I give a word to the simulated architecture of one of the scenes in Wagner's drama given this year on these boards. It is so very seldom that one sees an even approximately correct bit of architectural decoration on any stage, that such a brilliant exception as the interior of Monsalvat — the chief scene in *Parsifal*, and twice brought upon the stage — deserves a line of commendation. At the great German theatres much attention is paid to the setting of important dramas, and an effort is made to make them correct as well as brilliant. It is strange, in view of this effort and of the antiquarian knowledge which seems to come more easily to Germans than to any other people, that correctness should be so seldom attained. Of course the scenes are far more truthful than the travesties and hashes to which we are accustomed on our own stage; but it is odd that with their models so close at hand German decorators cannot do even better. In Dresden, for example, the stage settings are of extraordinary richness and elaborateness, are always most effective, and often exceedingly beautiful; but I did not see one among very many that was quite correct in detail. The nearest approach was in the second act of *Lohengrin*, where the street-scene with the cathedral and the palace was a marvel of truly pictorial beauty, and where a rather late type of Romanesque architecture was carried out with approximate correctness. The time of the play falls in the early years of the tenth century, and the architecture was of course too late in date; but it was consistent with itself, and the ruder, earlier style could hardly have been made so effective for scenic purposes. One would needs be the worst sort of a purist to cavil at so slight and excusable an anachronism. The scene at Bayreuth to which I refer was far and away the most beautiful I have ever seen on the stage. It represented the interior of an Hispano-Moorish building of the most magnificent sort. I will not say it was absolutely correct in detail, for I am not familiar enough with the style to set myself up as a competent critic; but it looked correct all through. There was no visible slip either in form or color, and both in form and color it was most beautiful. The front of the boards was a wide open space, beyond which one saw, in the centre of the stage, a great circular colonnade supporting a dome which curved up far out of sight; on either side were rows of smaller columns forming long, radiating vistas. The details of carving and painting were most elaborate, and the color so rich and so harmonious that one was affected as by the sight of a beautiful actual architectural example. Within the open circle of columns were ranged the tables at which the knights sat to partake of the holy meal. In the centre was the altar, raised on three steps, and behind it the high seat for the king. When the processions entered, and the personages — one could hardly consent to call them *actors* — took their places, the result was the finest I have ever seen. All were costumed alike, in admirably selected tones of grayish blue and dull lightish red, and every detail was carefully planned, down to the graceful yet apparently unstudied attitudes in which the pages grouped themselves on the steps of the altar. Not only one's ear was captivated and one's mind impressed by the scene, but one's eye completely satisfied. One waited for the next movement of any individual upon the scene, sure that it would be a movement of perfect harmony, of perfect grace or dignity. I have wandered away from architectural matters, I confess; but when *Parsifal* is fresh in one's memory, and when one has begun to speak of its scenery, it is hard to stop short therewith.

M. G. van Rensselaer.

GIRDERS. — V.

II. — DETERMINATION OF SECTION AT ANY POINT OF GIRDER.



AFTER finding the bending moment M, the stiffness or value of the moment of inertia I, and the additional area for resisting shearing required at any point, we have next to determine the actual dimensions of the corresponding section of the girder.

The general form of section must be assumed, suitably for the material of which it is to be constructed.

Several methods are available for finding the dimensions of the required section, either of which may be used as found most convenient for the special case.

I. — Direct methods by calculation.

These are only applicable to simple and symmetrical forms of section, or to those whose parts have a certain fixed relation to each other.

a. By means of algebraical formulæ.

This method is only preferable for those sections whose upper and lower portions are symmetrical to each other about the neutral axis of the section, and the centre of gravity is at the mid-height of the section. When this is not the case the formulæ become very complex and tedious and the indirect method is to be preferred.

Formulæ for I and d'.

1. Solid rectangular section. Fig. 74.

$$I = \frac{b\,d^3}{12}. \qquad d' = \frac{d}{2}. \qquad (10.)$$

2. Hollow rectangular section. Fig. 75.

$$I = \frac{b\,(d^3 - h^3)}{12}. \qquad d' = \frac{d}{2}. \qquad (11.)$$

3. Solid square section. Fig. 76.

$$I = \frac{s^4}{12}. \qquad d' = \frac{s}{2}. \qquad (12.)$$

4. Hollow square section. Fig. 77.

$$I = \frac{s^4 - s'^4}{12} \qquad d' = \frac{s}{2}. \qquad (13.)$$

5. I, L, or Z sections. Figs. 78, 79, 80.

$$I = \frac{b\,d^3 - b'\,b'^3}{12}. \qquad d' = \frac{d}{2}. \qquad (14.)$$

6. Open section. Fig. 81.

$$I = \frac{b\,(d^3 - h^3)}{12}. \qquad d' = \frac{d}{2}. \qquad (15.)$$

In applying these formulæ, the required value of I, obtained by means of Formula 4, 7, or 8, must be substituted for I in the formula corresponding to the desired form of section; then values must be assumed for all the other quantities in the formula excepting one, which may then be found by reducing the equation to its simplest form. A sufficient area must then be added to the section to safely resist the shearing strain acting at that point.

b. By means of Moll & Reuleaux's sections and formulæ.

These formulæ are only applicable to sections of the exact forms and proportions given in the corresponding figures; are only intended for cast-iron girders, and the sections are so proportioned that the compression at top of girder is just double the tension at the bottom; consequently, the centre of gravity is found at one-third the height of section from bottom.

FORMULÆ FOR MOLL & REULEAUX'S SECTIONS.

1. For inverted T-girders as shown in Figure 82.
$$I = 278.3\,b^4. \qquad d' = 8\,b. \qquad (16.)$$
2. For inverted T-girders as shown in Figure 83.
$$I = 269.4\,b^4. \qquad d' = 8\,b. \qquad (17.)$$
3. For inverted T-girders as shown in Figure 84.
$$I = 294.8\,b^4. \qquad d' = 8\,b. \qquad (18.)$$
4. For Hodgkinson girders as in Figure 85.
$$I = 922.9\,b^4. \qquad d' = 9\,b. \qquad (19.)$$
5. For box-lintel as in Figure 86.
$$I = 1284.6\,b^4. \qquad d' = 10\,b. \qquad (20.)$$

The required value of the moment of inertia I is substituted in the formula corresponding to the section, and the value of the unit of proportion b then found; it is then very easy to design the section according to the proportions given in Figure 86, since these are all multiples of the unit b. Sufficient area must then be added to resist the shearing strain, as before, and preferably to the web.

The same system of proportion might be applied to other forms of section for iron girders, and the corresponding simple formulæ for I and d' obtained; but this has never yet been done, so far as known to the writer.

II. — The indirect method.

By this method the section is first assumed, drawn, and its corresponding values of I and d' found and compared with the required value of I; if too large or too small, a second section is assumed more closely approximating the desired one, its value of I found and compared, etc.

It will usually be found that this process of approximation will require but few repetitions, and that there is less liability to error than by the use of the formulæ for complex sections. The method is principally graphical, requires only the ordinary instruments, is also perfectly general; being applicable to all forms of section and all materials, no matter how complex the sections may be, or whether formulæ have ever been deduced for them or not.

After finding the required section, the area for resisting must be added to it.

For a demonstration of the correctness of the graphical or indirect method see Ott's Graphic Statics, p. 109, or Clarke's Graphic Statics, pp. 111, 112.

The principal steps in the application of the method are as follows: —

a. Assume the form and dimensions of the section and draw it to as large a scale as possible, preferably full size.

b. Divide this section by horizontal lines into strips of equal or unequal height; find the area in square inches, and the centre of gravity of each strip.

c. Assume that a horizontal force, numerically equal to the area of the strip, acts horizontally through the centre of gravity of the strip, on a vertical beam, whose clear length equals the height of the section, and draw the lines of action of these forces.

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d. On any convenient horizontal line lay off the areas of the strips or the horizontal forces in order, from left to right and from top to bottom of the section. This line may be termed the load or "area" line.

e. Through the ends of this "area" line, draw lines inclined at 45° and intersecting in a point below the line, which will always be the required pole, which cannot in this case be assumed at random, but must be found only in this way; draw strings from this pole to each division of the area line.

f. Commencing anywhere on a horizontal through top of section, draw the equilibrium polygon parallel to these strings, and afterwards, the equilibrium curve, constructing them exactly as already explained for girders under continuous loading.

g. Produce the first and last sides of equilibrium polygon, which will also be tangents at the ends of the equilibrium curve, to intersect at a point. Through this point draw a horizontal line across the section.

h. Find the area included between the equilibrium curve and its tangents, in square inches, using the same scale for measuring as that of the section. This area between the curve and tangents may be termed the "inertia" figure.

i. The value of d' for the given section always equals the vertical distance from the horizontal drawn through the intersection of the two tangents, to the furthest fibres of the section, in inches.

j. The value of I for the section always equals the product of the area of the section into the area of the "inertia" figure, both taken in square inches.

k. The centre of gravity of the section will always lie in the horizontal drawn through the intersection of the tangents.

If the section be symmetrical about a vertical axis, the centre of gravity will be at the intersection of this axis and the horizontal. If unsymmetrical, the same method may be applied a second time, and at right angles to the first, so that a vertical line will be obtained, also containing the required centre of gravity, which must then be at its intersection with the horizontal.

The area of the "inertia" figure may be determined in several ways.

1. *By the method of equidistant ordinates.*

Draw a series of horizontal lines across the figure, at equal distances from the horizontal previously drawn through intersection of the tangents and from each other. Measure the length of that portion of each line included between the equilibrium curve and the tangents. Take the sum of half the upper and lower ordinates and the entire intermediate ones; multiply this sum by the vertical distance between two adjacent ordinates. This product will be the required area, though slightly in excess, because practically substituting a polygon with short sides for the equilibrium curve; it differs very little from the true area, which it approximates the more closely, the closer the horizontals are drawn to each other.

2. *By the Planimeter.*

The area of the "inertia" figure may be very quickly and accurately obtained by using Amsler's Polar Planimeter.

3. *By weighing.*

The figure may be transferred to sheet-lead, wood, etc., by tracing, cut out, and its area then determined by accurately weighing, and dividing this weight by the weight of one square inch of the same material, of the same thickness.

The lengths of the ordinates must be measured by the same scale as that of the section, so as to obtain the same area as if the section were drawn full size.

To fully elucidate the use of the graphical method, it has been applied to several of the more common forms of section.

Example 1. Solid rectangular section. Fig. 65.

The section is 4″ x 16″, consequently its area is 64 square inches. It is divided into four strips of equal height. The equilibrium polygon and curve are drawn as for a loaded girder, excepting that the pole must always be located at the intersection of lines drawn at 45° through ends of the "area" line.

The horizontal through intersection of tangents passes through centre of section, hence $d' = 8''$.

The ordinates are here drawn one inch apart and are measured at same scale as the section. They are found to be 0, .05, .23, .55, 1.00, 1.57, 2.26, 3.06, 4.00, 3.06, 2.26, 1.57, 1.00, .55, .23, .05 and .0. Their sum = 21.44, and this multiplied by 1, the distance between ordinates, = 21.44 square inches, the required area of the "inertia" figure. Since the area of cross-section = 64 square inches, the required moment of inertia $I = 21.44 \times 64 = 1372.16$.

Example 2. Box-lintel. Fig. 66.

The section is 12 inches high and wide, with metal 1.5″ thick. The bottom is taken as one strip, and the remainder divided into four strips of equal height. The equilibrium curve and tangents are found as before.

Centre of gravity is found to be 7.48″ from top of section, which is the value of d'.

Area of inertia figure is found to be 14.41 square inches. Area of section = 49.5 square inches. Hence $I = 14.41 \times 49.5 = 713.4$.

Example 3. Z-girder. Fig. 67.

Also 12 inches high; lower flange 12 inches wide with edge turned up 3 inches; upper flange 6 inches wide; metal 1.5 inches thick.

Value of $d' = 7.3''$

Area of inertia figure = 19.09 square inches; of section = 42.75 inches.

Hence $I = 19.09 \times 42.75 = 816$.

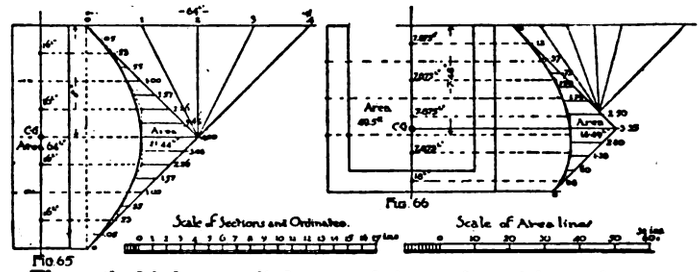

Fig. 65 Fig. 66

The method is here applied a second time and at right angles to the first, to find the exact location of the centre of gravity. But this is not necessary, for the value of d' can be measured from the horizontal through intersection of tangents, as this must pass through the centre of gravity of the section.

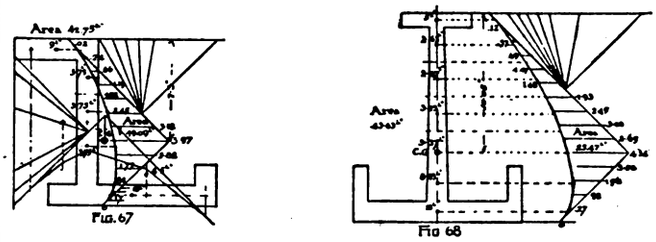
Fig. 67 Fig. 68

Example 4. Hodgkinson girder. Fig. 68.

Height 15 inches; lower flange 12 inches wide and 1.5 inches thick; upper flange 1″ x 5″; web 1 inch thick at top, 1.5 inches thick at bottom. The centres of gravity of the strips of the web vary but slightly from their geometrical centres, and at which they are assumed to act.

Value of $d' = 10.08''$.

Area of section = 43.63 square inches; of inertia figure = 25.47″.

Hence $I = 43.63 \times 25.47 = 1111.2$.

Example 5. Inverted Y-girder. Fig. 69.

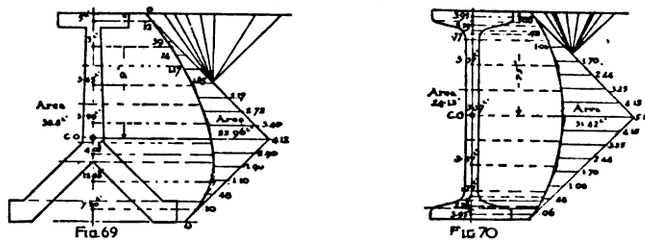
Fig. 69 Fig. 70

Height 15 inches; upper flange 1″ x 5″; base 12 inches wide; metal 1.5 inches.

Value of $d' = 9.00$ inches.

Area of section = 38.8 square inches; area of inertia figure = 22.96 square inches.

Hence $I = 38.8 \times 22.96 = 690.7$.

Example 6. Carnegie Brothers' 15-inch 80 lb. beam. Fig. 70.

Value of $d' = 7.5$ inches.

Since the beam weighs 80 per foot, its sectional area = 24 square inches. Area of inertia figure = 31.42″.

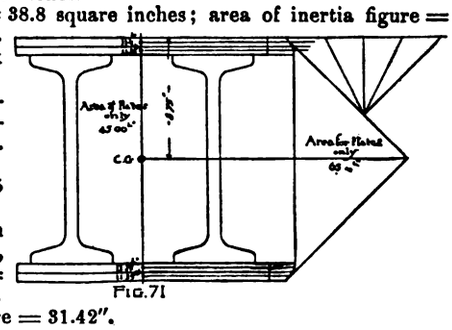
Fig. 71

Hence $I = 24 \times 31.42 = 754$.

The value given in Carnegie Bros.' pocket-book is 750, or about one-half of one per cent smaller.

Example 7. Box-girder. Fig. 71.

Composed of two 15-inch 80-lb. I-beams, with top and bottom plates each 18 inches wide and 1.25″ thick.

As the value of I has been obtained for the I-beams in the last example, it will only be necessary to find that for the top and bottom plates. That portion of the equilibrium curve lying between the plates will be a straight line, as in the figure.

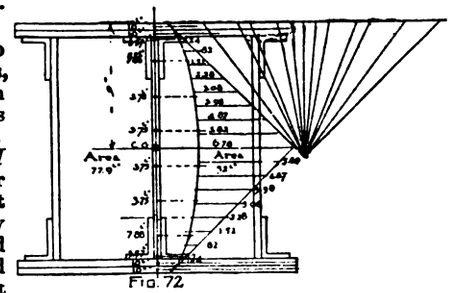
Fig. 72

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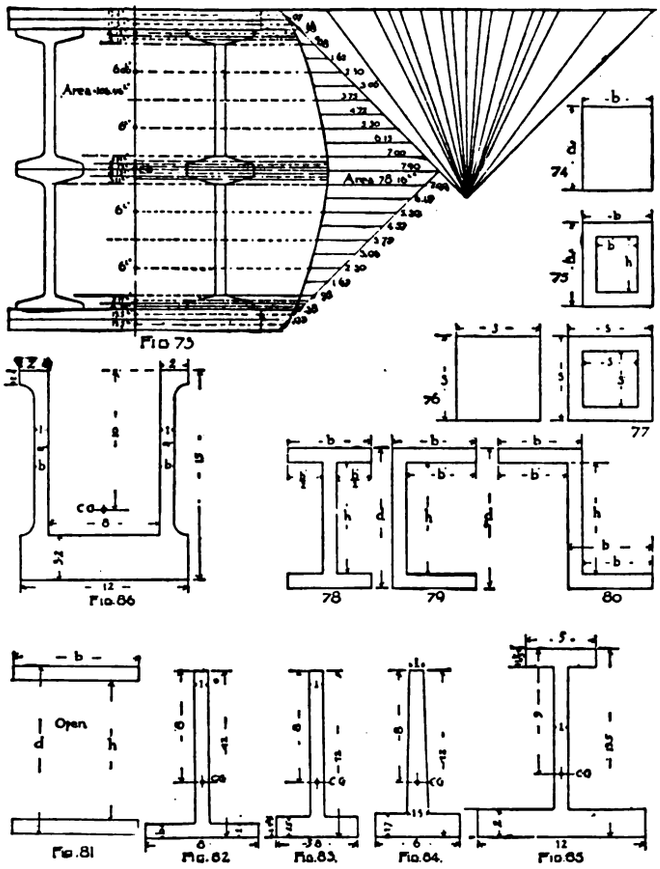
As the total height of girder = 17.5 inches, d′ = 8.75 inches.

Area of inertia figure = 65.4 square inches; of top and bottom plates, 45 square inches.

Hence, I for plates only = 65.4 × 45 =	2943.5
And, I for two I-beams = 2 × 754 =	1508.0
Total value of I for the entire section =	4451.5

This value of I would be lessened by the rivet-holes, but these can be allowed for in determining area of the strips, or the girder can be a little wider.



Example 8. U. S. Girder. Fig. 73.

Composed of four Carnegie Bros.' 10-inch 45-lb. I-beams, with top and bottom plates 18 inches wide, and 1.5 inches thick.

Value of d' = 11.5 inches.

Area of inertia figure = 78.16 square inches; of section = 106.96 inches.

Hence, I = 78.16 × 106.96 = 8360.

The last example can also be solved by calculation.

1. For top and bottom plates, by formula 15, I = 6250.5.

2. For the four I-beams.

According to Carnegie Bros'. pocket-book, I for one I-beam of the given section = 187.

This moment of inertia is taken about an axis passing through its centre of gravity and horizontal. When its moment of inertia is required about any other axis, parallel to the first, the given value of I must be increased by the product of the sectional area of the beam into the square of the distance between the two axes.

Or, let A = sectional area of the beam in square inches.

Let d'' = distance between the two parallel axes, in inches.

Let I = moment of inertia about axis passing through centre of gravity.

Let I' = required moment of inertia about the new axis.

Then, $I' = I + A\,d''^2$. (21.)

In this case, the distance between the axes = 5 inches, and the sectional area of one beam = 13.5 square inches.

Hence, for one beam I' = 187 + (13.5 × 5 × 5) = 524.5; and for the four beams I' = 524.5 × 4 = 2098.

Total value of I for entire section = 6250.5 + 2098 = 8348.5.

Though this result is slightly smaller than that obtained graphically, it is sufficiently exact for all practical purposes.

In solving the preceding examples, the sections were drawn one-third full size: more nearly correct results would have been obtained if they had been full size and the ordinates taken nearer to each other, say one-fourth inch apart.

GIRDERS. — III.

(Erratum. Page 192, ninth line from bottom of left column.

"3. On the vertical depth of the section," the resistance to bending "varying directly as the cube of this," and resistance to breaking, directly as its square.)

THE WICKED VERMONTER.

THE humorist of the New York *Times* gives in his own peculiar and veracious style further particulars of the building dispute between a church society and an owner of adjacent property, which we mentioned in a recent issue: —

The plan for the reorganization of the Egyptian army which has recently been drawn up by Baker Pasha and approved by the English authorities may be an admirable one, so far as the interests of England are concerned, but it reminds one very suggestively of the History of the Baptist Meeting-house and the Wicked Vermonter.

The Vermonter in question was a very wicked man, who had voted no less than twelve successive times the entire Democratic ticket; who was notoriously addicted to cider-brandy strong enough to cause a corrugated-iron boiler into which a pint of it had been placed to double up in cramps, and who particularly disliked the leading Baptists of his native town.

About a year ago the Baptists, who had until that time held their weekly services in a building belonging to the local hose-company, decided to build a meeting-house on a piece of land immediately adjoining the Wicked Vermonter's back yard. With a view of bringing the gospel as near to him as possible, they resolved to build the west wall of the meeting-house close to the Wicked Vermonter's fence, leaving a distance of only ten inches between the two. The windows of the meeting-house would thus overlook the Wicked Vermonter's garden, and he could hardly fail to hear a good deal of the sermon, no matter how carefully he might stay away from the services.

While the workmen were laying the foundations of the meeting-house the Wicked Vermonter was removing his fence and building in its place a stout stone wall. He placed the wall within two inches of his boundary line, and by the time the Baptist workmen were ready to begin to build the west wall of their meeting-house his private wall was already four feet high.

Between the two walls there was just room for one person to pass, and as a matter of course the Baptist workmen had to pass that way continually. The Wicked Vermonter, with diabolical cunning, inserted a large number of stout iron barbed hooks in the outer surface of his wall for the purpose, as he afterward declared, of preventing boys from scaling the wall and stealing his apples. The immediate effect of this peculiar method of wall-building was that on the first day after the hooks were placed in position no less than nine Baptist workmen were caught. The hooks penetrated their clothing and, in some instances, their flesh, and when, toward evening, the superintendent of the work came to see what progress had been made during the day, he was dismayed to find nearly all his workmen securely fastened to the wicked man's wall, and work on the Baptist meeting-house practically suspended.

A lawsuit instantly followed. The Baptists claimed that the Wicked Vermonter had obstructed their ancient lights by erecting his wall, and that it was therefore a nuisance which must be abated. The Wicked Vermonter in reply urged that as the Baptists had not as yet constructed any building on their land they had no lights, modern or ancient, which could be obstructed by his wall. Moreover, he set up the counter-claim that the new meeting-house, were it to be completed and used, would interfere with his ancient cats, who had from time immemorial enjoyed the right to walk over his fence and to indulge in evening concerts with no one to molest them; whereas, the constant singing of hymns in the new meeting-house would annoy the cats, and there would be great danger that hymn-books would be thrown at them out of the gallery windows on Sunday mornings by irreverent and objectionable Baptist boys. The court overruled this plea on the ground that the privileges of cats did not come under the head of easements. It refused, however, to give judgment as desired by the Baptist petitioners, and permitted the wicked man's wall to stand, although it required him to remove his hooks.

The Wicked Vermonter removed his hooks, but he continued to build his wall, always keeping it at a foot higher than the Baptist wall, so that it could not be said that it obstructed any existing window of the meeting-house. The Wicked Vermonter explained that it would not be his affair if the Baptists were to be guilty of the

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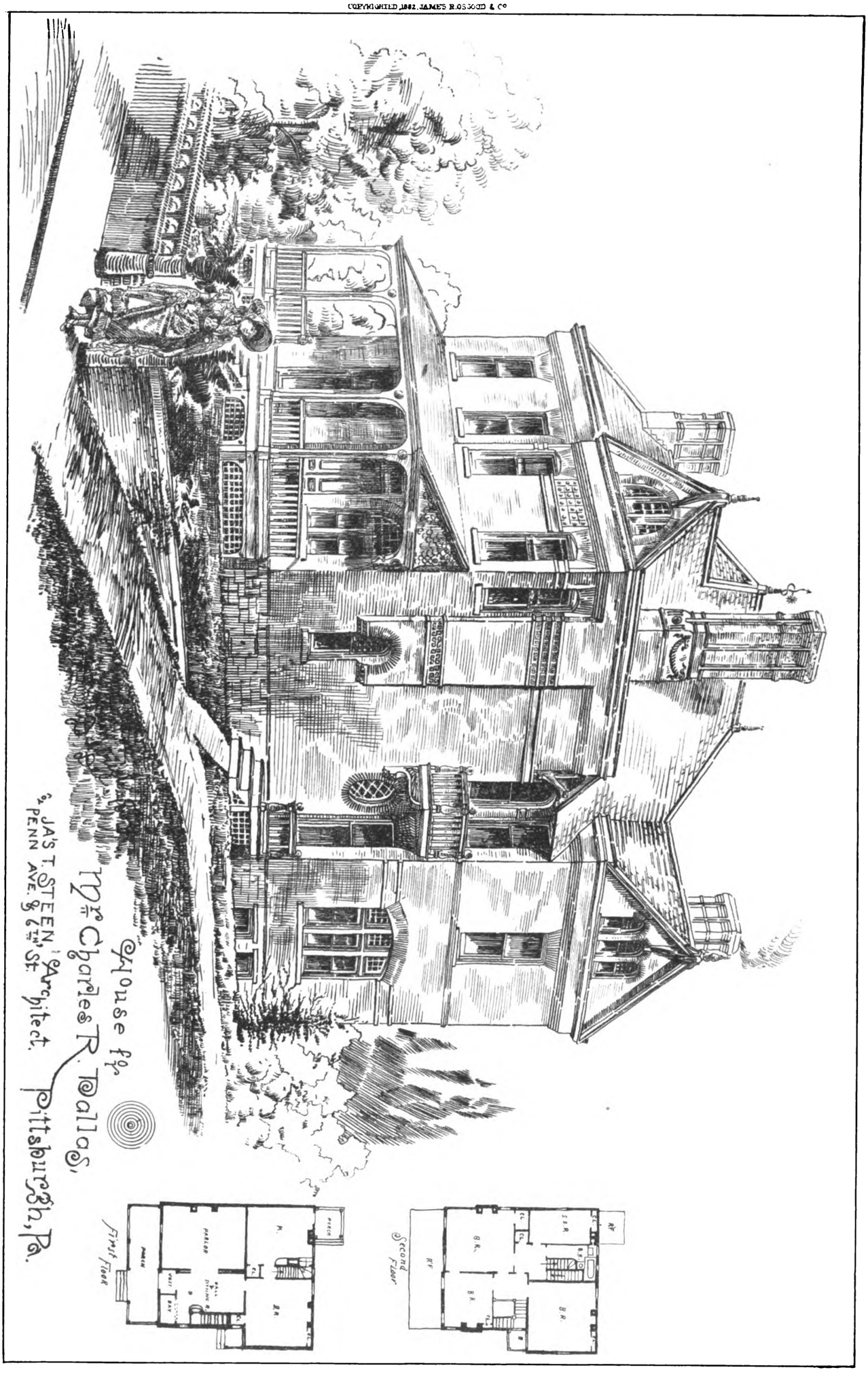

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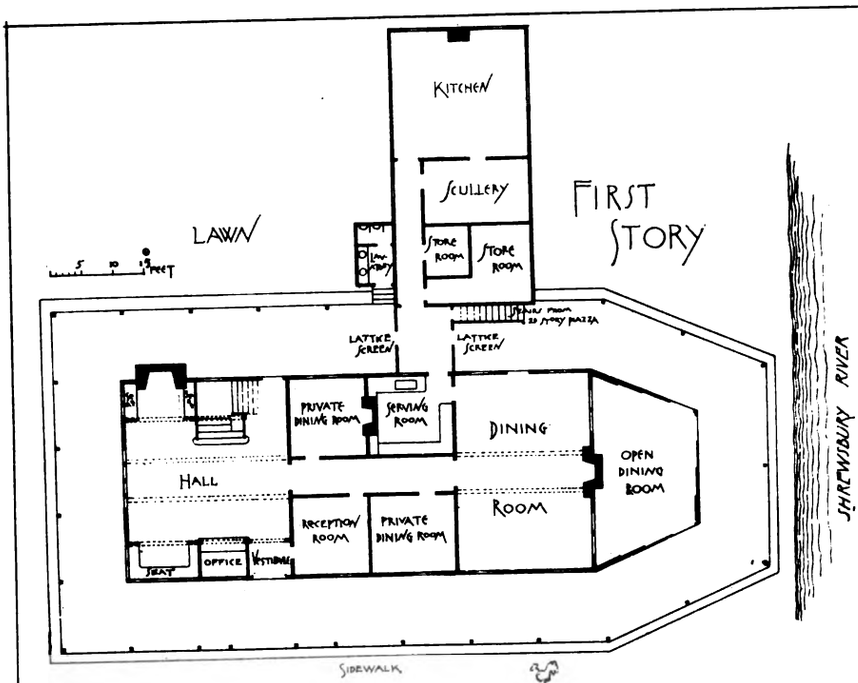

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WILLIAM & CO

Interior of Entrance Hall:
Seabright Hotel:
H. Edwards Ficken:
Architect.

The Seabright Hotel: Seabright N.J:
Rebuilt by H. Edwards Ficken. Architect:

Heliotype Printing Co. 211 Tremont St. Boston.

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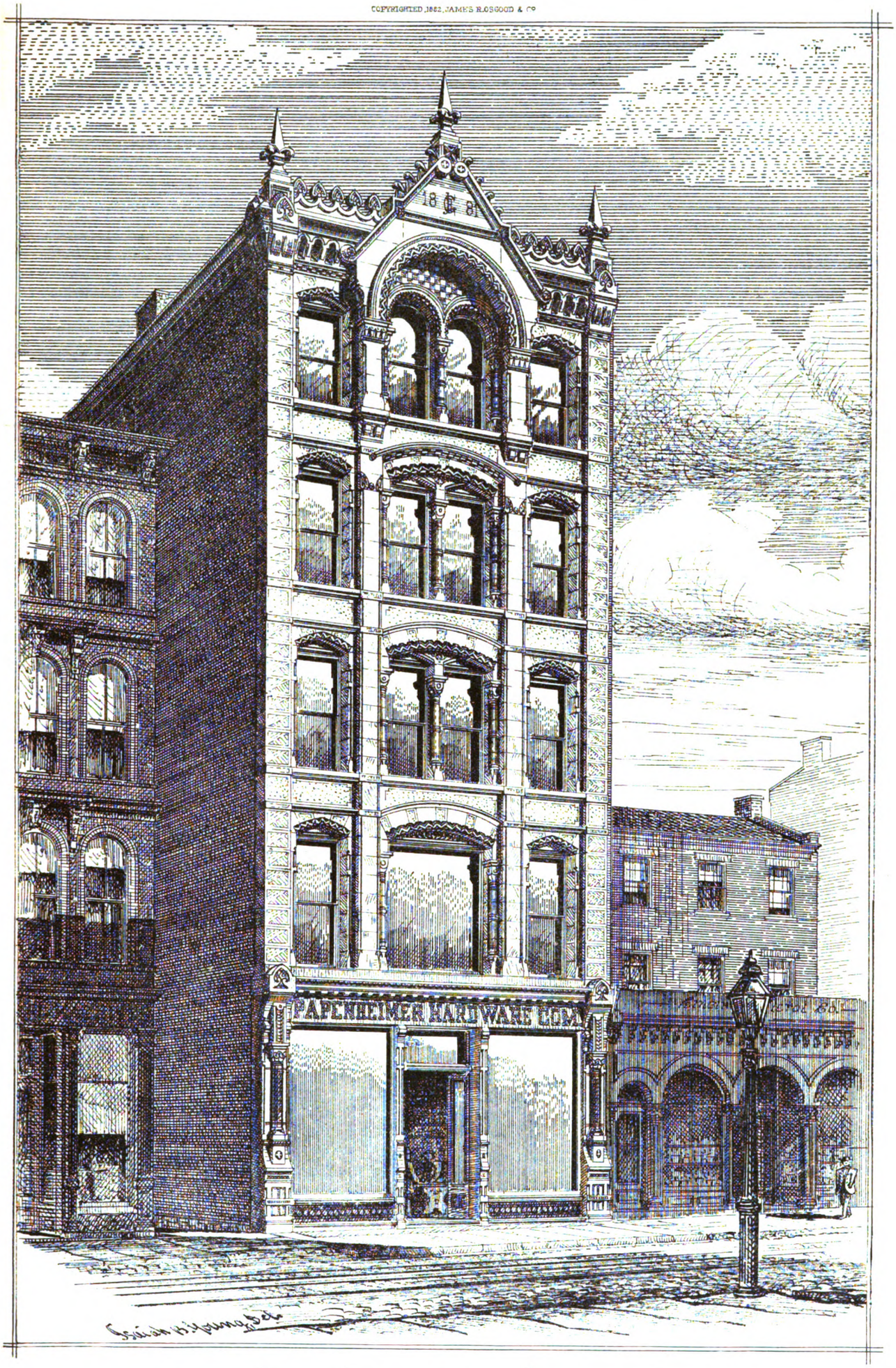

STORE BUILDING AT CINCINNATI, O.
E. ANDERSON, ARCHT.

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folly of putting windows where they would command a view of nothing but his wall, and in such case he could only regret the folly and blindness of his adversaries.

When the wicked man's wall had reached the height of fifteen feet he decided to cover it with a coating of powdered glass, in order to preserve it from the elements, and as a first step he covered the stones with a composition far more sticky than shoemaker's-wax. In the course of the next day about one-half of the local Baptists were firmly stuck to the wicked man's wall. They had visited the site of the new meeting-house with a view of celebrating the laying of the corner-stone, the celebration having been delayed because of the absence of several leading Baptists at the time when the corner-stone was actually laid. The Baptists caught by the Wicked Vermonter were of all ages and assorted sexes, and several hours were spent in the painful process of prying them loose. A new lawsuit was brought, but the Baptists were defeated, the court holding that the Wicked Vermonter had a right to put a sticky composition on the outside of his wall as a necessary preliminary to coating it with powdered glass. The result was that the Baptists pulled down the wall which they had already built, and began the construction of a new one twenty feet from the Wicked Vermonter's wall, and the latter sat almost continually on the summit of his own wall and taunted the Baptist workmen with their defeat, in a way that would certainly have produced a breach of the peace had the latter been other than exceptionally good men.

There is hardly room to point out the resemblance of this history to the reorganization of the Egyptian army, but fortunately the resemblance is so close that it hardly calls for explanation.

THE ILLUSTRATIONS.

SEABRIGHT HOTEL, SEABRIGHT, N. J. MR. H. EDWARDS FICKEN, ARCHITECT, NEW YORK, N. Y.

THIS is the old Emory Hotel, which formerly stood on the opposite side of the road, moved across to its present location, raised to give an almost new story under, and having a new attic story added to it. The main feature of the alterations and additions, however, is the open octagonal dining-room on the end facing the Shrewsbury River. This room is enclosed on all sides by large sliding sash-doors, which can be thrown back to make the room an open piazza in fine weather, while it loses none of its attractiveness in bad weather, when closed up, by still retaining its openness to the beautiful views obtainable all round through the sash-doors. The enlargement of the building includes a kitchen out-building with the usual offices, and other smaller buildings for stables, laundry, ice-house, gas-house, etc. The entrance-hall shown in the accompanying drawing is finished in white and yellow pine, merely oiled and waxed, the balustrade of the stairs only being of ash.

HOUSE FOR CHARLES R. DALLAS, ESQ., PITTSBURGH, PA. MR. JAMES STEEN, ARCHITECT, PITTSBURGH, PA.

The walls are built of good selected red brick laid in red mortar. The roof is of painted shingles, and the interior is all finished in clean white-pine, shellacked and varnished. The cost is $5,000.

STORE AT CINCINNATI, O. MR. EDWIN ANDERSON, ARCHITECT, CINCINNATI, O.

SANITARY ENGINEERING.[1]

THE late meeting at Newcastle of the Sanitary Institute of Great Britain was presided over by Captain Douglas Galton, C. B., whose inaugural address was delivered on Tuesday evening. We regret that pressure on our space prevents us from publishing this address *in extenso*, for it is truly a valuable contribution to the literature of hygienic science; we must, however, content ourselves with considering a few of its salient features. While some of the leading and important laws of health have been as well known as they have been generally neglected, at all events since Moses formulated his famous sanitary rules and regulations, it is only of very late years that the causes of disease are becoming understood, and the researches of Pasteur, Tyndall and others, which are still in progress, are rapidly tending to demonstrate a common origin to that wide class of diseases called zymotic, the limits of which are not yet defined. To the well-known saying that "dirt is only matter in the wrong place," may be added another, that disease, and death itself, is but life in the wrong place. The phenomena of fermentation and putrefaction have been shown to be due to the presence of almost infinite and ever-present numbers of germs of elementary life, ready to spring into activity under favorable conditions, and to develop those phases of vital energy known to us as fermentation and putrefaction, and which in some of their indefinitely numerous varieties assume forms of disease in the lower animals and in man, such as typhoid, cholera, tubercular disease, diphtheria, malarial fever, etc. The minuteness, number, and rapidity of reproduction of these — to the higher forms of life — fatal organisms entirely pass beyond our powers of conception, as is illustrated by the famous experiment of Pasteur. This physicist discovered that if the point of a needle be dipped in the blood of a fowl suffering from chicken cholera, and the minute portion thus removed be transferred to pure chicken soup kept free from contamination by air-borne germs, that after a short time the solution becomes turbid with the mass of organisms developed, and if a minute portion be removed in the same way with the point of the needle and transferred as before to another solution, the same process is repeated with a similar result. In this way a hundred generations of "microbes" may be reproduced, and if fowls be inoculated with, or caused to swallow, a small quantity of the last solution, the disease is at once developed in all its original force. Time, however, plays an important part in this experiment. If the solution containing the germs be kept for a period of weeks or months, the conditions of vital energy are so far changed that the inoculation produces far less violent consequences, diminishing with the length of time the solution has been kept. A very interesting experiment, made by M. Gustave le Bon, illustrates another phase of the same phenomena of these obscure forms of life. M. le Bon, by steeping finely hashed meat in water, produced a liquid swarming with bacteria. This liquid injected under the skin of a frog speedily proved fatal, though the animal could breathe the offensive effluvia arising from the mixture without coming to harm. On the other hand, after the liquid had been kept for two months, combining it with the blood of the frog by injection produced no apparent effect, while the animal was killed by inhaling the gases arising from the mixture. Whether death in this case arose from a more subtle form of antagonistic elementary life, or whether the effect was purely toxical, it would probably be impossible to prove.

These two experiments appear to illustrate some of the great and constant dangers to which human life is exposed by disease. The infinite number of vital germs, their easy reproduction, their sustained vitality through long series of generations, their undiminished energy so destructive to the higher forms of life, their easy transmission, reception, and assimilation by the system, are all indicated in Pasteur's wonderful experiment. On the other hand, the gradual change that takes place in the energy of a mixture charged with bacteria, not free to reproduce beyond the restricted limit in which they are first developed, is shown in M. le Bon's experiment. In this latter, the emanations, whether they be new forms of life developed from the extinct bacteria, or only chemical compounds, contain the fatal elements, while the residual and once deadly mixture becomes harmless. Inevitably these invisible but powerful agencies are always at work destroying vitality, or rather converting that form of it with which we are most familiar into other combinations of matter and energy, which after a long series of changes may assume again the condition of motion inherent and inseparable from the phenomenon of life, and so on in an apparently ceaseless round.

Sometimes, as with Pasteur's chicken broth, the germs, after completing their destructive work in one organism, are transferred in their descendants to another, developing typhoid, cholera, and other epidemics in those persons who offer suitable elements for their development and extension. Sometimes, as in Le Bon's experiment, the more apparently active germs having disappeared, the subtler but equally sure elements of destruction are disseminated, and may develop malarial fever or other diseases such as may be induced by breathing the emanations from old cesspools or sewage-impregnated soil.

As it is the duty of the physicist and physician to investigate the causes, and endeavor to combat the results of the too frequent encounters with their invisible foe, so it is the work of the engineer to remove as far as possible all facilities for the reproduction and dissemination of the germs, by insuring a constant and ample supply of pure water and pure air. We have a powerful ally in this perpetual struggle. It is not in every organism that the bacteria finds a congenial resting-place, and nature is a rapid and never-tiring purifier, converting the dangerous energy of this form of life to other and more neutral phases. Crowded centres afford the most striking illlustration of what can be done both in the way of developing disease-generating germs, and also in destroying them or averting their effects as shown by the death statistics of cities under varying conditions of sanitary efficiency. Thus in London the death-rate during the five years following 1868 was 27.0; during the same number of years ending in 1881 it was 23, and last year it was only 21.7. The city of Munich offers, perhaps, the most striking illustration of the effects of sanitary efficiency. Between 1854 and 1859, when there was a total absence of all attempts at sanitation,

[1] From *Engineering*.

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the death-rate from enteric fever was 24.2 per million; from 1860 to 1865, when the porous sides of cesspools were cemented to stop the filtration of sewage into the ground, it was reduced to 16.8; from 1766 to 1873, when the drainage system was partly complete, it was 13.3, and by 1880, when the works were complete, it had sunk to 8.7. In the same way the statistics of many other cities might be adduced to show the results which follow the prompt removal of sewage, instead of allowing it to remain and develop into active energy the latent forms of elementary life with which it teems.

In the course of his address Captain Galton devoted considerable time to the consideration of the effects produced on public health by pure air and ventilation, and he prefaced his remarks by referring to the labor of a number of investigators: Mr. Aitken, Mr. Langley, Professor Chandler Roberts, Professor Tyndall and others. It will be remembered that Mr. Aitken has conducted a series of experiments on dust in the air, especially with reference to the cause of fog, which he considers is due to the existence of particles of solid matter floating in the air, upon and around which, as a nucleus, vapor condenses and becomes visible; air deprived of its dust cannot produce visible vapor. Mr. Langley, during his valuable solar investigations, which are not yet completed, has detected the existence of dust at a height of fifteen thousand feet above the sea. This was partly due to particles of matter transmitted through the higher strata of the air by wind-currents, and also partly to the meteoric dust which is constantly falling onto our earth from interplanetary space. Carrying the question further, Professor Tyndall has shown how even on the summit of the Alps the dust in the air contains bacteria germs, and he has developed them in infusions from which all organic life had been previously removed. M. M. Davy, of the Montsouris Observatory, Paris, has found that the air in crowded places and near sewer-openings contains more bacteria germs than the air outside the city, and he has also proved that there are fewer of these elements of life in rainy and in very dry periods. In winter, too, the number is at a minimum, and at a maximum in autumn. Little beyond the fact of their plentiful existence is known of these organisms, but it is reasonable to assume that they are not all of the same character and that they produce different effects upon the higher forms of life, some resulting in disease, and others being innocuous. It is even supposed that there may be varieties capable of useful assimilation by complex organisms. It is found that there is a striking correlation between the more or less plentiful development of this elementary life, under certain conditions of climate and atmosphere, as already carefully observed, and the prevalence of those diseases which recent investigations show to be the visible result of this noxious energy. In hot climates these relations are especially evident, and in the military statistics of the British army at home, a very striking instance is given of the reduction that can be effected in mortality by a reduction in the quantity of germs. Not many years ago, when sanitation was little understood or heeded, the deaths from tubercular disease amounted to 10 per 1,000; that is the present percentage of deaths from all causes in the army at home. Now, the number of deaths from this particular malady is 3 per 1,000: a satisfactory proof of the results attending the removal of germs from the air of the barracks and hospitals; for, as Professor Tyndall has recently shown, tubercular disease is one of those dependent upon, and propagated by, the existence and development of living organisms. Air and water are the media for the passive existence of these beings, and for their transmission to congenial soil, and in every instance the removal of causes favorable to their development is followed by a diminution of disease and death. In towns and villages where ignorance and indifference combine to encourage the one, the other follows as a necessary result. In various parts of London, old, ill-ventilated, and unsanitary houses, in which the rate of mortality was as high as 50 per 1,000, have been removed, and in their place improved dwellings have been erected. A special feature of the more recent of these tenement-houses is the provision of ample space around them for the free circulation of air and unobstructed ventilation. In these the rate of mortality has sunk to 13 in the 1,000.

The conclusion to be drawn from the experience obtained and investigations carried out, and to which Captain Galton called especial attention, was that by proper attention to sanitation the death-rate among the lower classes of city populations may be reduced to 15 or 16 per 1,000. Upon this subject of longevity some interesting details were given, taken from the statistics compiled by Mr. Chadwick and Dr. Richardson. In these statistics the lives considered are divided into five classes as follows: gentry, salaried classes, retail dealers, artisans and laborers, and domestic servants. Out of 100 deaths of the first class 6 were of children in their first year and 9 of children before their fifth year. In the artisan class the corresponding leaths were 22 and 39 respectively. The average length of life of the first class is 55 years 8 months; of the working class, 28 years 9 months. Of course infant mortality reduces the totals to a high degree; yet, excluding them, the averages tell a melancholy story of the effects of inefficient sanitary arrangements, although of course the habits and necessities of the working classes aid greatly in reducing the term of artisan life. In London the mean term for the highest class, exclusive of those dying before the age of 20, is 61; while that of the working class is 47 years and 3 months. It is very truly pointed out that "a low standard for the mean duration of life n the wages-earning class is not a necessity. It is controllable by the surroundings in which they live, and the fact of how largely the death-rate is influenced by their surroundings is evidenced by the condition of health in Improved Industrial Dwellings." Further statistics than those already quoted are available. In London the death-rate taken over a series of years in the buildings of the Metropolitan Association for Improving the Dwellings of the Laboring Classes has varied from 14 to 17 per 1,000, and in those of the Improved Industrial Dwellings Company they have been during a term of thirteen years 16.2 per 1,000. In Newcastle similar results are obtained: for the year ending June of 1882 mortality in improved dwellings has been only 12 per 1,000; while that for the rest of the city was 21 per 1,000. During the five years ending June, 1882, nearly twenty thousand prisoners passed through the prison at Newcastle-on-Tyne, and although there were during this period epidemics of scarlatina, typhus and small-pox in the town, no deaths arose from either of these causes. The deaths among these prisoners, exclusive of those suffering from disease when admitted, was, in 1881, only .021. But it is needless to multiply instances of the results of neglect of sanitary laws, or of the consequences of obedience to them; they are now well known, and their application is growing year by year of wider extent, with, amongst other beneficial consequences, that of insensibly leading the lower classes to the appreciation of a higher condition of physical life. The work remaining to be done is almost incalculable, and the average of human life must, for many years to come, remain at an unnecessarily low figure; but in our day in this city epidemics such as those which have ravaged London in the past are practically impossible.

The rapidly-increasing knowledge now being acquired as to the causes of a large range of diseases, our better acquaintance with those mysterious elementary organisms which depend for life upon the death of higher developments, should lead, not perhaps to a suppression of their existence, but to some sort of control over them: but certainly to a modification of their nature and influence. Already Pasteur, Tyndall, and others have opened a new path for medicine to advance upon, and when once the pioneers of science have advanced in any direction it is impossible to hazard a guess, in these days of rapid progress, how far they will go or when they will stop. There is a vast field for exploration in this invisible world of vital energy, the lowest, so far as we now know, in the scale of development, but which nevertheless plays a most important part in relation to the highest phase of life.

PNEUMATIC DRAINAGE.

A NEW system for the protection of houses from the infiltration of sewer-gas and the disposal of town sewage has been introduced at Paris and Lyons by M. J. B. Berliez, civil engineer, and former director of the Compagnie des Vidanges, of Lyons. An illustration of this new system can now be seen in working order at the barracks of the Pépinière, Boulevard Malesherbes, where a thousand soldiers are quartered, and with the permission of M. Berliez we were able to examine every detail of the process. Underneath the closets the old cesspool has been emptied, thoroughly cleaned, and converted into a cellar. Here we found M. Berliez's apparatus. From each closet above, a pipe communicates with an iron cylinder or drum. Within this first receptacle there is an iron basket which will retain a hard substance, such as a brush, or even an infant if thrown down the drain. The detection of crime is thus facilitated, and the obstruction of pipes rendered impossible. A portable handle, affixed from the outside, is used about once a week to impart a strong rotary motion to this basket; the presence of any hard substance is then detected by the sound, and any accumulation of softer substances macerated and driven out.

From this first receptacle, and by natural gravitation, the liquefied sewage flows into a second iron receptacle placed close at hand, within a yard or so. A large ovoid floater occupies the greater part of the space within, the pointed end fitting hermetically an opening at the bottom, where the pneumatic suction keeps the floater in its place. It is not till the receptacle is almost full of water that the floater is able to disengage itself from this suction, and rising enables the sewage to escape by passing under the floater into the pipes, where the pneumatic suction carries it away. This suction is produced by a steam-engine situated in the suburb of Levallois-Perret, and the iron pipes, placed within the main sewers, communicate not only with the Pépinière barracks, but with several private houses, and with a depot at the Place de la Concorde, where the contents of many cesspools are brought and emptied. The total distance is 4,600 metres. It is, therefore, on an extensive scale that the experiment has been tried, and so far has worked well, giving rise to no sort of nuisance, and instead of allowing sewer-gas to ascend house-drains, drawing it, on the contrary, away.

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It is proposed to place these apparatus under all the houses of Paris instead of cesspools; to draw by pneumatic action all the sewage to depots situated in the open country outside Paris, and there pump it forward distances varying from ten to fifty miles, where it may be used either to irrigate farms or be precipitated and converted into solid manure. It is calculated that the sale of this manure and an annual tax of £2 8s. for every house where the system is applied will cover working expenses and yield a large profit. This tax would be an economy on the present cost of emptying cesspools, and the sanitary advantages secured would be an inestimable benefit. The principal objection to the system, so far as its application to towns such as Paris is concerned, rests in the fact that the iron used for the pipes must corrode under the action of sewage-matter, and the slightest leakage would cause a total collapse of the whole system. Careful, constant supervision and prompt repairs would be indispensable. Then, the avoidance of nuisance depends on the frequent usage of the closets, as fermentation would set in if the receptacles were left half-full for a few days. Families leaving home would have to carefully flush their closets the last thing before their departure; for though each house would be thoroughly protected from sewer-gas, it would not be protected from any noxious gas arising within the receptacles. Fortunately these receptacles are very small, and must, in ordinary households, be frequently and automatically emptied during the day; so that, generally speaking, there would be no time for mischief to arise. — *Lancet.*

MONTHLY CHRONICLE.

OCTOBER 1. A heavy hurricane does much damage in Ireland.

October 4. Fall of a platform crowded with spectators during the Procession of the "Veiled Prophet," at St. Louis. Many persons injured.

A "line-man" killed by an electric-light wire in New York.

October 5. The accidental dropping of the iron fire-curtain of the Berlin, Germany, Opera-House causes intense panic. Several persons seriously crushed.

October 8. Burning of the West Street Concert Hall, Brighton, Eng.

October 10. Slight earthquake shock felt at Montreal, Canada.

October 11. Slight earthquake shocks and tidal waves at Panama.

October 18. An oil-lamp chandelier in the Baptist Church, Roxboro, N. C., falls during service. Several persons dangerously burned and crushed during the consequent panic.

October 19. A series of gas explosions takes place in the sewers of Philadelphia. No damage done.

A three-story brick house at Frankford, Pa., demolished by the explosion of benzine. One person dangerously burned.

October 21. Typhoon at Manilla makes 60,000 families homeless. Loss of life comparatively small.

October 24–27. Bicentennial Celebration at Philadelphia of Penn's landing.

October 26. Reed's Opera-House and Hotel at Salem, Oregon, burned.

Unveiling of the statue of Thomas Carlyle on Thames Embankment, London.

October 26–27. Annual Convention of the American Institute of Architects, at Cincinnati, O.

October 28. Burning of the Flint Mill, Fall River, Mass.

October 29. Village of Grindelwald near Berne, Switzerland, nearly destroyed by a hurricane.

October 30. Three four-story brick houses on Eighth St., Philadelphia, fall during alterations. One woman injured.

October 31. Burning of the Park Theatre, New York, before the play. Two lives lost.

A portion of the Riverside Paper Mill at Lafayette Station, Pa., falls down. Two persons injured.

Burning of the Massini Theatre, Barcelona, Spain. No lives lost.

CALCULATING GIRDERS.

ILLINOIS INDUSTRIAL UNIVERSITY,
CHAMPAIGN, ILL., October 21, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Your readers are certainly under obligation to Mr. Berg for his clear presentation of the arithmetical method for finding the maximum bending moment acting on a girder. (Vol. 12, page 186.) His mode of procedure is a general one: better than those usually found in the text-books, and more convenient than the graphical method when the loading is uniform or concentrated at but few points. But the graphical method has been preferred in the essay on girders, for the following reasons: —

It is perfectly general, employing the same general mode of procedure for a loading arranged in any manner; the diagrams are readily drawn, requiring no instruments other than those in the hands of every draughtsman; the necessary computations are as few and simple as possible; an acquaintance with the mathematical theory of the resistance of materials is not necessary, though always preferable (this theoretical and mathematical knowledge is not possessed by large numbers of architects and draughtsmen in the United States); after the diagrams are once drawn, the shear at any point can be found by measuring the length of a line, and the bending moment by multiplying the length of another line by a constant, the pole distance; serious errors are less likely to be made graphically than arithmetically by most persons, and if made are much more easily detected; the shear and bending moment can be found at as many points as may be required, each only requiring the measurement of two lines and a single multiplication; while by the arithmetical method the moment of each force on one side of the point about the point must be computed and their algebraical sum taken.

Besides, the graphical method has never received the attention which it deserves, since it is usually only applied to the determination of the bending moment and shear, and students are at a loss how to proceed to obtain the moment of inertia or dimensions of the corresponding section required for the girder.

It is usually the case that the maximum bending moment is alone necessary, since most girders are of uniform section from end to end; but this is not true of cast-iron girders, where the bending moments and shears must be found at several points. When wrought-iron girders are built up with top and bottom plates, these can be made of several thicknesses of metal, diminishing in number from centre to ends of girder, thus securing greater economy of material and cost, quite important in very heavy girders.

For several years past I have found it preferable to express length in feet and loads in net tons, making the proper changes in the ordinary formulæ; for this renders the formulæ more simple, the co-efficients are smaller, and fewer figures are required in the computations, though if logarithms are employed, the gain is not as marked. The value of the moment of inertia is unchanged if the formulæ are properly modified, since the dimensions of the cross-section are always taken in inches.

As an illustration, take the following example: —

A white-pine floor-joist is 20 feet in clear length, 2 inches thick, spaced 16 inches between centres, and supports a floor whose total weight with its load is 90 lbs. per square foot. We will assume the maximum permissible deflection of the joist to be .03 inch per foot, or .6 inch at the centre. Required the minimum safe depth of this joist by the formula for flexure.

1. $d = \sqrt[3]{\frac{270 \times 1.2 \times 20^3}{858. \times 2 \times .6}} = \sqrt[3]{\frac{270 \times 1.2 \times 8000}{858 \times 2 \times .6}} = 13.6$ inches.

2. $d = \sqrt[3]{\frac{5 \times 2400 \times 240^3}{32 \times 1716000 \times 2 \times .6}} = \sqrt[3]{\frac{5 \times 2400 \times 13824000}{32 \times 1716000 \times 2 \times .6}} = 13.6$ inches.

The saving in labor of computation is certainly very marked.

The modified formulæ for transverse strength and flexure will be given in a subsequent portion of the essay.

The letter W is used merely to represent the load on the girder in net tons, without regard to its mode of arrangement. I am aware that different symbols are usually employed for loads concentrated at centre and uniformly distributed; but the advantages of this course are not apparent to me, as the student must remember to use the proper formula in either case, and is likely to be confused by the different symbols.

Mr. Berg's proposed use of capitals and small letters in formulæ is a good idea; still, formulæ should be written with the fewest symbols possible, so that professional men shall be least likely to err in making hurried computations.

I employ W, U, L, C and T in the same sense that he does, but use B instead of K, L in place of Δ.

Yours truly, N. CLIFFORD RICKER.

THE FEE FOR EXTRA SUPERINTENDENCE.

NEW YORK, November 2, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Nine months ago I was sent to this country by a foreign company, to superintend a building they were going to erect in this city. Their contracts were made in Europe with a firm which undertook to do all the work according to full specifications and plans furnished by the company's architect abroad, and for a sum of $————, all payments to be made directly to the contractor's agent here. My duty was therefore to see that said contract was faithfully carried out and to report home. I had no responsibility either as architect or agent, and received a monthly salary for my services, my office expenses being paid; and I was to be free to do any other work, provided it did not interfere with my duties.

Since my arrival I have been the only person in this country acting for the company. I have been obliged to alter the plans to comply with the laws of the city, increasing thereby the expense considerably and modifying the plans. The nature of the soil obliged me also to make very expensive and difficult foundations, building stone piers fifteen feet below the soil under very dangerous circumstances, the whole work involving very great responsibility. Besides, I was ordered to add several important parts onto the building, and to make all the plans, full detailed estimates, make and sign contracts; and besides all this I was obliged to act as authorized agent and attend to general business, despatching goods, paying taxes, etc. All money has also been sent to me directly; I had to make all payments, etc. My acts have been endorsed by the company, but they refuse to admit my claim for payment for all the extra work of every kind not accounted for in our previous agreement. As a subscriber to your paper I request that you should kindly inform me at earliest possible period what fees are allowed to architects in such cases, for the professional services of different nature stated, for general management as agent, and for the management of the funds. You would greatly oblige

Yours very truly, C. M. J.

[WE know of no rule whatever for determining the proper rate of compensation in such cases, where there is no previous understanding. Super-

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intendents in our large cities are often paid from two to four per cent on the cost of the work under their charge. Architects generally consider the superintendence, if it is included in their duty, as constituting about two-fifths of their work, and allow that proportion of their regular commission of five per cent for it. As to being entitled to any compensation above the stipulated salary it depends entirely on the legal construction of the contract existing between you and your employers. — Eds. American Architect.]

AUTOMATIC SPRINKLERS FOR BOSTON THEATRES.

Boston, November 7, 1882.

To the Editors of the American Architect: —

Dear Sirs, — I beg to call your attention to a curious coincidence. Yesterday the Police Commissioners of Boston established an ordinance by which the proprietors of every theatre in Boston are to be required to protect the stage and all other combustible parts of the building with automatic sprinklers similar to those which have done so much service of late in the factories.

In this morning's *Herald* an account is given of the extinguishing of a fire in the Providence Theatre Comique, during a play, by the automatic sprinklers — with so little injury, even to the scenery, that the performance was not stopped.

The attention of the Fire Commissioners of Boston was called to the expediency of making this requirement some time since, and the public may feel grateful for their judicious energy, and to the Police Commissioners for the establishment of this ordinance by their joint action.

E. A.

NOTES AND CLIPPINGS.

Architects without Plans. — The interesting testimony of Sir George Birdwood to the fact that the architects of India are not in the habit of using plans in the erection of their buildings, though not exactly bearing on Mr. Morris's original statement respecting the builders of Santa Sophia, is one that can be amply borne out by every one familiar in any way with Mussulman countries. Certainly in Egypt the traditional absence of plans is of great antiquity. Some recent research on the history of the art of the Arabs having led me to consult the Arab historian Abdal Latif's "Account of Egypt," not in the Latin translation of Pococke, the son of the famous old Oxford Orientalist, nor in that of his successor, White, but in the French translation of Silvestre de Sacy, the following passage, to be found in the fifth chapter, as the testimony of the writer of the twelfth century, seems curiously to confirm Sir George Birdwood's statement respecting the Indian builders: "When a palace or other edifice has to be built, the architect to whom the execution of the building has been confided is called in. He visits the spot, plans it out in his mind according to the nature of the building required, after which he successively undertakes the different portions and terminates them one after the other, so that each may be used and occupied as it is completed." Prisse d'Avennes, our latest authority respecting Arab art, tells us that the Arabs commenced the construction of a house by tracing the general plan on the earth with the aid of a sack of dry plaster, and to show how tenaciously the tradition has been handed down to our days, relates an anecdote of Mehemet Ali's treasurer, who, seeing the plans of his palace thus being laid out, angrily ordered the plaster to be replaced by flour, as the symbol of fecundity. — *The Athenæum.*

A Pleasant Mediæval Borough. — Mr. Henry Armstrong, medical officer of health for the city, gave a history of Newcastle from a health point of view. Having regard to the many difficult sanitary problems to be dealt with, he urged that it was necessary to remember the extreme antiquity of the borough. In the thirteenth and fourteenth centuries, epidemics, which lasted from one to three years, occurred in the borough. In the time of James I. so little regard was had to cleanliness, that the "dunghill" within the castle precincts "had increased to such a size and bigness that it was in length 98 yards, the depth of it was 10 yards, and the breadth of it 32 yards," some 27,000 tons of filth having thus been allowed to accumulate. In the seventeenth century the great plague was one of eleven epidemics; it alone caused seven thousand deaths, and it led, by the almost complete desertion of the town and port, to a ruined trade and wasted treasury. Even in 1853, at the date of the then prevailing cholera epidemic, it is reported that the town so abounded in narrow yards, lanes and "entries," that in one district alone there were streets exceeding a mile in length, which had an average width of some four feet only. Since then rapid progress has been made, and although much remains to be done, yet the reduction of the yearly death-rate per one thousand by ten in as many years, and the diminution in the same time of typhus to one-fifth of its prevalence in the period immediately before, are matters of congratulation and tangible results of good work effected. — *Paper read at English Lamlay Institute.*

Remains of the Wall of Philip Augustus. — There still exist in Paris considerable remains of the great wall with turrets which Philip Augustus began before he joined Richard of England in his Crusade. The positions of some of these relics are pointed out by *Galignani* as follows: "In the Cour de Rouen, near the Passage du Commerce, is the lower portion of a turret still intact, with a piece of wall covered with ivy. It forms part of the playground of a school, and children may be seen climbing over this relic of the past. In the Rue Clovis is another fragment bordering on the Rue des Fossès Saint-Victor. At the bottom of the courtyard of the house No. 31 Rue Dauphine is a turret almost entire, which serves as a warehouse and residence. In the Rue Guénégaud, 31, are also the remains of a tower which was joined to that in the Rue Dauphine by a wall which ran in one direction to the Tour de Nesle, and in the other to the Porte Dauphine. It was recently used as a forge. On the right bank of the Seine the enceinte had a wider circumference. Several houses still contain fragments incased on their walls or inclosed in their gardens."

Stone-Dressing by Steam-Power. — According to the *Baugewerks-zeitung*, the use of facing-stones of terra-cotta will in future experience the competition of natural stone dressed by steam-power. The new invention of Herr Schmidt has apparently been proved by trials to combine simplicity of mechanical arrangement with economical and rapid working. Former attempts in this direction have been based on the idea of imitating stone-dressing by hand, and the machinery has been devised for the purpose of producing a smooth surface by the removal of all uneven portions, but Herr Schmidt has worked on a different plan. He has applied the principle of a saw with as great a power as can be obtained to the production, at the same time, of two surfaces ready for use. The inventor seems to have been to some extent influenced by the stone-boring machine, which was the means of accomplishing the gigantic tunnelling works of St. Gothard and Mont Cenis. He seems to have reasoned that by the judicious application of the principle of this machine it ought to be a matter of no insuperable difficulty to produce a stone-dressing machine able to supersede manual labor. A provisional machine, of limited size, was constructed, in which a small steam-cylinder imparted a vertical striking motion to a pair of steel chisels of equal width. A stream of water was used in conjunction with this appliance, and as the chisels penetrated the block of stone, two regular and even surfaces were produced. This trial was made with the hardest syenite granite. An ordinary stone-dresser, working with a hand-saw, can produce in a day of eleven hours, according to the journal named: —

	Square feet of cut surface.
4.30 to 6.45	in sandstone.
1.82 to 2.15	in marble.
0.21 to 0.32	in granite.

The smallest machine on Herr Schmidt's principle, with one small steam-cylinder, can produce in the same time 43 to 65 square feet of cut surface of granite, and therefore represents the daily labor of 200 workmen. It is the same thing to the machine whether hard granite or soft sandstone is given to it to cut, but the quality of work done varies, of course, according to the hardness of the material. The machine is, therefore, a reliable test of the exact comparative hardness of various descriptions of stone. The piston only requires a limited stroke of 1½ inches to 2 inches, and gives about one thousand blows per minute without the chisels heating, as a continuous stream of water serves the double purpose of keeping them cool and of carrying away the minute particles of stone, etc., which are constantly accumulating. This is a considerable gain to the workmen from a sanitary point of view, as there is no stone-dust thrown off. There is provision made for the stone-dust being deposited by the water which flows away, in such a manner that it can be easily removed. It is used in the ceramic industry, and is therefore of some value. The inventor delayed bringing his machine in a prominent manner before the industrial public until it had been subjected to the most difficult tests.

Asbestos in Italy. — The mining for asbestos in Italy is as yet limited to the Provinces of Sondrio and Turin. The asbestos in the former occurs in regular strata, varying in thickness from 3 to 4 inches, though in some cases it has been found 20 inches thick. The enclosing rocks are chloritic and talcose schists of a greenish color, and the asbestos is found chiefly in fibrous masses of a yellowish-white color. In some cases the fibres are long and firm, resembling a skein of thread of a yard or more in length. It has also been found that asbestos abounds in the fissures of serpentine rocks, and is often accompanied by other minerals, among which garnets of a green color have been found in minute crystals, to which the miners have given the name of "Semenize Dell'Amianto," meaning seeds of asbestos. The excavations are carried on in forty different places, and as a rule the enclosing rock is quarried by blasting. In some cases where too much material would have to be removed, the workings are driven forward in the asbestos-yielding stratum, leaving pillars here and there to support the roofs of the workings. In the Province of Turin asbestos is obtained in the mountainous districts and serpentine rocks, and occurs in veins varying in thickness from ¼ inch to 4 inches. The length of these veins in some cases amounts to about 20 yards, their depth, however, being very limited. Various qualities are found, but unfortunately the asbestos having the largest and finest fibres is often decomposed so as to make it useless for many purposes. In 1878 the workings in the Province of Sondrio yielded about 80 tons of the material, and gave employment to 200 persons during seven or eight months, while those in Turin furnished 100 tons and employed 200 hands. The industry, which is now rapidly increasing, is in the hands of six firms, two of which are English companies. One of them has established a manufactory near Rome, while the others work up the raw material at Turin. The products furnished are principally card-board for steam-joints, packing for steam-engines, covering for steam-pipes and boilers, fire-proof paper and incombustible cloth. It is estimated that the industry now gives employment to about 500 persons, 400 being in the mines and 100 in the factories. — *Iron Age.*

Llanthony Abbey. — Father Ignatius has made reply to Walter Savage Landor's recent sharp note concerning the restoration of Llanthony Abbey. His point is that the old residence of the author Landor is not Llanthony Abbey at all, but an "old priory," and that the only Llanthony Abbey in existence is quite another and more modorn structure. "I have never attempted," he writes, "to collect money to restore Llanthony Abbey, for the simple reason that until I built the present abbey there was no such building in existence as Llanthony Abbey. Neither am I collecting, nor have I collected, funds for building Llanthony Abbey. The funds have all been provided by three members of our own order. The only Llanthony Abbey that ever existed belongs to me, and not to Mr. Landor. I have built it on land the title-deeds of which are in the hands of my lawyer. I have not attempted to do anything for the old priory which Mr. Landor temporarily possesses, except to pray to God for its restoration to His service in His own time and in His own way."

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

266,600-601. DOOR-BOLT.—Arthur C. Blayney, Chicago, Ill.

266,604. DOUBLE-SEAMING MACHINE. — Orrin W. Burritt, Weedsport, N. Y.

266,606. PORTABLE ADJUSTABLE WINDOW-BALCONY.—George W. Cannon, Poughkeepsie, N.Y.

266,613. HOT-AIR GENERATOR FOR FIREPLACES.—Jesse S. Deardorff, Canal Dover, O.

266,623. TENONING-MACHINE.—William D. Herschel, Philadelphia, Pa.

266,642. REVERSIBLE SCREW-DRIVER.—Frank R. Partridge, Augusta, Me.

266,658. TRESTLE.—Daniel E. Teal, Oneida Castle, N. Y.

266,671. PLUMB-BOB.—William L. Bergen, Batavia, Ill.

266,691. WINDOW-PLATFORM AND FIRE-ESCAPE.—Frank H. Heimsath, Chicago, Ill.

266,706. AUTOMATIC FIRE-ALARM.—Morris Martin, Malden, Mass.

266,730. WEATHER-STRIP. — Theodore Steckel, Kleecknersville, Pa.

266,758. COMBINED LOCK AND LATCH.—Richard F. Bridewell, San Francisco, Cal.

266,763. METHOD OF CORRUGATING WOOD.—John J. Burk, Buffalo, N. Y.

266,795. PNEUMATIC DOOR-CHECK.—Gilbert R. Elliott, Boston, Mass.

266,799. SASH-FASTENER. — Louis Felsburg, New Haven, Conn.

266,809. DRAIN AND SEWER.—Henry B. Greenleaf, Boston, Mass.

266,816. HEATER FOR DWELLING-HOUSES.—James B. Harris, Jr., Geneseo, N. Y.

266,829. BARN-DOOR.—James L. Johnston, Columbiana, O.

266,863. LATCH AND LOCK COMBINED.—William Michel, Mount Sterling, O.

266,870. WATER-CLOSET VALVE.—Emil Moellman, Cincinnati, O.

266,871. BENCH MORTISING-MACHINE.—William S. Morgan, Evansville, Wis.

266,876-877. FIRE-EXTINGUISHER. — Daniel Parham, Tyngsborough, Mass.

266,878. COMPOUND FOR ARTIFICIAL STONE.—Antonio Pelletier, Washington, D. C.

266,887. CLAMP.—Thomas Reno, Detroit, Mich.

266,903. DOOR-FASTENING DEVICE. — Jules T. Schertser, Jefferson Barracks, Mo.

266,918. MANUFACTURE OF GLASS WATER-CLOSET BOWLS.—Junius A. Talmadge, Meriden, Conn.

266,920. CLAMP. — Harrison H. Taylor, Detroit, Mich.

266,933. FIREPLACE.—Charles A. Wellington, Lexington, and Albert Chase, Boston, Mass.

266,947. LOCKING-LATCH. — Joseph Zerfas, New York, N. Y.

10,224. (*Reissue.*) HYDRAULIC ELEVATORS.—Cyrus W. Baldwin, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report twenty permits have been granted, the more important of which are the following: —

Emanuel M. E. Church, South, stone church, s w cor. McCollough and Presstman Sts.

Ansley Gill, 4 two-st'y brick buildings, s s Ramsey St., w of Addison Alley.

Frank E. Davis, 4 four-st'y square brick buildings, w s Carrolton Ave., n of Lanvale St.

Pindall & Frisby, 6 two-st'y brick buildings, s s West St., w of Paca St.

John M. Getz, 5 three-st'y brick buildings, Biddle St., between Valley and Wilcox Sts.

C. C. Rumpf & Co., three-st'y brick building, 40′ x 42′, n s Portland St., w of Green St.

Robt. Garrett & Sons, iron-covered shed, 13′ x 230′, O'Donnell's Wharf, in front of Maryland Sugar Refinery.

Wm. Butzler, three-st'y brick building, e s Valley St., between Biddle and Chase Sts.

Wm. Hyeser, 2 three-st'y brick buildings, e s Valley St., between Chase and Biddle Sts.

Henry Schermer & Aug. Hanneman, 2 three-st'y brick buildings, n w cor. Washington and Jefferson Sts., fronting w s Washington St.

George M. Wirth, two-st'y brick building, William St., between West and Cross Sts.

Wm. Bowman, two-st'y brick building, 44′ x 50′, n e cor. Eden St. and Hammond Alley.

Boston.

BUILDING PERMITS. — *Brick. — Commonwealth Ave., No.* 264, Ward 11, for John W. Shapleigh, three-st'y mansard dwell., 25′ x 60′; Antoine Xavier, builder.

Washington St., near Neponset St., Ward 24, for Boston Gas Light Co., one-st'y hip governor house, 24′ x 24′; Wm. C. Whyte, builder.

Western Ave., rear of, near Harvard St., Ward 25, for Solarized Rubber Co., one-st'y flat engine-house, 30′ x 30′; Patrick Grace, builder.

Harrison Ave., nearly opposite Haywood Place, Ward 12, for Cyrus T. Clarke, four-st'y flat dwell. and store, 12′ x 56′ 6″.

Beacon St., No. 322, Ward 11, for R. D. Evans, four-st'y pitch dwell., 28′ x 71′; Woodbury & Leighton, builders.

Beacon St., No. 166, Ward 11, for Geo. O. Shattuck, four-st'y flat dwell., 30′ x 72′; Woodbury & Leighton, builders.

Mayo St., Ward 16, for Boston Building Association, four-st'y flat tenement, 36′ x 42′; Albert J. West, builder.

East Second St., near H St., Ward 14, for Henry Souther, four-st'y flat storage, 36′ x 125′; Arthur C. Brastow, builder.

Lehigh St., rear of, near South St., Ward 12, B. & A. R. R. yard, for B. & A. R. R. Co., two-st'y pitch iron signal-house, 10′ x 34′; J. G. Wheeler, builder.

Howard Ave., near Harlow St., Ward 20, for City of Boston, two-st'y pitch primary school-house, 37′ and 71′ 2″ x 78′; Robert R. Myers, builder.

Wood.—Neponset St., cor. Washington St., Ward 24, for Boston Gas Light Co., one-st'y pitch exhauster building, 26′ 4″ x 29′ 6″; ell, 20′ x 29′ 6″; Benj. Tarbox, builder.

Marginal St., near Jeffries St., Ward 2, for Abiel Gove, one-st'y pitch storage, 16′ x 20′; Abiel Gove, builder.

Centre St., rear of, near La Grange St., Ward 23, for Samuel B. Dana, executor, two-st'y pitch storage, 24′ x 27′; ell, 24′ x 28′; Geo. A. Spear, builder.

Tremont St., near Oak Sq., Ward 25, for Patrick Carr, one-st'y pitch stable, 14′ x 18′.

Atwood Ave., No. 2, rear, Ward 22, for Theoda H. Crosby, one-st'y pitch storage of plants, 10′ x 25′; R. D. Ward, builder.

Border St., No. 420, Ward 1, for Isaac Pratt, Jr., et. al., two-st'y flat storage, 22′ x 32′; N. Littlefield, builder.

Arion St., No. 4, near Davenport Ave., Ward 20, for Guy A. Clifford, two-st'y pitch dwell., 28′ x 32′; Guy A. Clifford, builder.

Arion St., No. 6, near Davenport Ave., Ward 20, for Guy A. Clifford, two-st'y pitch dwell., 28′ x 32′; Guy A. Clifford, builder.

Vinton St., near Dorchester St., for J. D. Thompson, one-st'y pitch mechanical, 18′ x 26′; Isaac H. Dunn, builder.

Boylston St., near Lamartine St., Ward 23, for Henry P. Jordan, one-st'y flat wagon-shed and office, 26′ x 50′; Henry P. Jordan, builder.

Keyes St., near South St., Ward 23, for John Gately, one-st'y pitch mechanical, 20′ x 30′; John Gately, builder.

Pleasant St., near Downer Ave., Ward 24, for T. W. Hoxie, 2 two-st'y flat dwells., 21′ 6″ x 39′; Wm. T. Eaton, builder.

Everett Ave., near Cushing Ave., Ward 24, for Frank P. Nash, two-st'y hip dwell., 31′ 6″ x 34′ 8″; W. A. Blazo, builder.

Everett Ave., cor. Cushing Ave., Ward 24, for Frank P. Nash, 2 two-st'y hip dwells., 22′ x 31′; ell, 14′ x 18′; W. A. Blazo, builder.

Tudor St. No. 75, Ward 13, for Patrick Hanlon, three-st'y flat dwell., 24′ x 40′; Patrick Hanlon, builder.

Dunstable St., Ward 5, for J. A. Pearson; one-st'y flat harness-maker's shop, 17′ x 30′ and 32′; G. M. Starbird, builder.

Rockwell St., near Milton Ave., Ward 24, for Mrs. M. E. Moulton, two-st'y pitch dwell., 22′ and 28′ x 32′ 6″; E. F. Moulton, builder.

Cushing Ave., near Everett Ave., Ward 24, for Frank O. Nash, two-st'y hip dwell., 31′ 6″ x 34′ 8″; W. A. Blazo, builder.

Harvard Ave., near Farrington Ave., Ward 25, for Samuel W. Shorey, 2 two-st'y pitch dwells., 14′ and 20′ x 50′; Henry M. Perry, builder.

Clay Ave., near Commercial St., Ward 24, for O. C. R. R. Co., one-st'y pitch passenger station, 22′ x 40′; ell, 15′ x 18′ 6″.

Rockland St., near Washington St., Ward 23, for Allin Cong. Church, Dedham, one-st'y pitch wagon-shed, 20′ x 25′; Tucker & Co., builders.

Train St., near King St., Ward 24, for Frank O. Nash, two-st'y hip dwell., 25′ and 31′ x 34′ 6″; ell, 17′ 9″ x 20′; W. A. Blazo, builder.

Brooklyn.

BUILDING PERMITS.—*Hall St.*, w s, 160′ s Willoughby Ave., two-st'y brick stable; cost, $3,500; owner, Mr. Coverly, Washington, D. C.; architect and carpenter, Ed. Van Vooris; mason, S. L. Keeney.

St. John's Pl., s s, 100′ e Seventh Ave., 5 three-st'y brownstone dwells., tin roofs; cost, each, $8,000; owner and builder, Thomas Fagan; architect, R. Dixon.

South Elliott Pl., e s, 100′ s Fulton St., 2 three-st'y brownstone dwells., tin roofs; total cost, $17,000; owner, Charles Cheesborough, Northport, L. I.; architect, C. A. Snedeker; builders, T. B. Rutan, and E. Snedeker.

Bergen St., n s, 200′ e Fifth Ave., four-st'y brick tenement, tin roof; cost, $8,000; owner, Miss Ann McCarty, 100 De Kalb Ave.; architect, S. W. Osmun.

Suydam St., e s, 112′ s Bushwick Ave., two-st'y frame dwell.; cost, $3,000; owner, F. Freidlein, Hopkins St., near Throop Ave.; builder, J. Rueger.

Metropolitan Ave. No. 44, s s, 289′ 8″ w Olive St., two-st'y frame dwell.; cost, $3,500; owner, Edmund Peek, 52 Metropolitan Ave.; architect, J. B. Harned; builder, G. H. Doolittle.

Broadway, e s, ——n Furman Ave., 2 two and three st'y frame dwells., tin roof; total cost, $5,500; owner, Martin Euler; architect and carpenter, George Distler.

Seventh St., Nos. 207 *to* 211, n s, 80′ w Fifth Ave., 4 two-st'y brick dwells., tin or gravel roofs; cost, total, $12,000; owner and carpenter, Edward H. Mowbray, 162 Centre St.; architect, P. H. Gilvarry; mason, J. J. Cody.

Sands St., s s, 151′ 4″ e Jay St., four-st'y brick store and tenement, gravel roof; cost, $12,000; owner, John Romayne, 130 Sands St.; architect, M. J. Morrell; builder, P. J. Carlin.

George St., Nos. 40, 42, *and* 44, near Central Ave., four-st'y brick and bluestone ice-house, tin roof; cost, $40,000; owner, Leonard Eppig, 32 George St.; architect, Chas. Stoll.

Macomb St., n s, cor. Fifth Ave., 8 three-st'y brick tenements, tin roofs; cost, $——; owner, Henry Lansdell, Ninth St., cor. Fifth Ave.; builders, J. M. Brown and C. B. Sheldon.

Chicago.

FACTORY. — Carey, Ogden & Parker have just commenced building a paint and oil manufactory, to cost $25,000, from designs by Jaffrey & Scott.

HOUSES. — J. H. Bell is to build a house on Drexel Boulevard, pressed brick, with stone trimmings, to cost $12,000; and Louis Lloyd a building for flats, on Winchester Ave., to cost $10,000, from plans furnished by L. G. Halberg, architect.

Dr. Earle is about to build a house on West Washington St., to cost $15,000; designed by C. P. Thomas, architect.

BUILDING PERMITS. — A. W. Rudwick, two-st'y and basement brick dwell., 22′ x 60′, 105 Blackhawk St.; cost, $4,500.

H. Smyth, two-st'y and basement brick store and dwell., 25′ x 58′, 676 Larrabee St.; cost, $5,000.

C. Zrerker, two-st'y brick dwell., 22′ x 45′, 81 Le Moyne St.; cost, $2,500.

C. L. Dix, three-st'y brick dwell., 28′ x 60′, Indiana Ave., near Twenty-second St.; cost, $4,000.

C. L. Jenks, 5 three-st'y and basement brick stores and dwells., 50′ x 150′, Nineteenth and Clark Sts.; cost, $25,000; Cass Chapman, architect.

Herman Repennery, three-st'y brick store and dwell., 429 Ogden Ave.; cost, $7,000.

F. Worst, two-st'y brick dwell., 20′ x 36′, 381 Fifth Ave.; cost, $4,000.

John Cowey, two-st'y and basement brick store and dwell., 23′ x 60′, 637 South Ashland Ave.; cost, $4,500.

John T. Davis, 12 two-st'y and basement brick dwells., 56′ x 264′, 288 to 326 Bissell St.; cost, $50,000.

J. W. Litchfield, two-st'y and basement brick dwell., 25′ x 40′, 731 and 733 Monroe St.; cost, $14,000.

F. Heid, three-st'y brick dwell., 22′ x 60′, 583 Wells St.; cost, $5,500.

James Grace, one-st'y cottage, 21′ x 40′, 331 Hudson Ave.; cost, $3,000.

Smith, Gaylord & Cross, six-st'y and basement brick store, 91′ x 162′, 111 to 117 Michigan Ave.; cost, $90,000.

John S. Oehman, three-st'y and basement brick dwell., 50′ x 70′, 2245 and 2247 Wentworth Ave.; cost, $10,000.

Geo. C. Hutchinson, three-st'y and basement brick factory, 50′ x 150′, 196 and 198 Desplaines St.; cost, $20,000.

A. E. Bournique, four-st'y and basement brick dancing-academy, 60′ x 127′, 2324 Calumet Ave.; cost, $30,000.

E. H. Valentine, three-st'y brick dwell., 50′ x 72′, 288 to 292 South Ashland Ave.; cost, $18,000.

John Jecel, two-st'y brick dwell., 21′ x 56′, 760 Eighteenth St.; cost, $3,000.

Cincinnati.

FACTORY.—Messrs. Snider & Co. Preserve Works are to build a six-st'y factory on Augusta St., 80′ x 134′; cost, $25,000; E. Anderson, architect.

BUILDING PERMITS.—J. M. Brunswick, five-st'y brick factory, St. Clair Alley; cost, $7,000.

Peter Lane, 4 two-st'y brick dwells., Eighth St., near State Ave.; cost, $20,000.

J. E. Burdge, two-st'y brick dwell., Sherman Ave., near Western Ave.; cost, $5,000.

Wm. Mulluly, two-st'y frame dwell., Warsaw Pike; cost, $2,000.

F. W. Handy, repair four-st'y brick, 183 West Second St.; cost, $2,300.

Total permits to date, 624.

Total cost to date, $1,852,900.

Denver, Col.

HOTEL. — W. H. Cox, five-st'y brick and stone hotel, 125′ x 150′, Stout St.; cost, $160,000; E. P. Brick, architect.

BUILDING PERMITS. — W. J. Kinsey, three-st'y brick building, 125′ x 125′, Wynkoop St.; cost, $20,000; F. E. Edbrooke, architect.

H. C. Brown, two-st'y brick dwell., 53′ x 63′, Sherman Ave.; cost, $20,000; Wm. Quayle, architect.

Frank Church, double brick dwell., 40′ x 49′, South Fourteenth St.; cost, $8,000; F. E. Edbrooke, architect.

H. C. Sargeant, two-st'y brick dwell., 40′ x 60′, Lincoln Ave.; cost, $10,000.

P. T. Hughes, two-st'y brick business block, 75′ x 125′, Holladay St.; cost, $22,000.

H. E. Peck, two-st'y brick store, Larimer St.; cost, $7,000; L. A. Heard, architect.

Mrs. H. A. Chichester, double two-st'y brick dwell., 42′ x 63′, Glenarm St.; cost, $10,000; J. H. Littlefield, architect.

R. H. McMann, terrace of 6 two-st'y brick dwells., 47′ x 125′, Twentieth St.; cost, $20,000; J. H. Littlefield, architect.

W. L. Ward, brick dwell., 40′ x 70′, Grant Ave.; cost, $13,000; H. R. Marshall, New York, architect.

W. L. Ward, terrace of three-st'y brick dwells., 39′ x 125′, Lincoln Ave.; cost, $2,600; H. R. Marshall, New York, architect.

Colorado Mortgage & Investment Co., one-st'y brick stores, 75′ x 115′, Larimer St.; cost, $31,500; J. W. Roberts, architect.

G. W. & Wm. Clayton, four-st'y business block, 50′ x 125′, Larimer St.; cost, $60,000; J. W. Roberts, architect.

New York.

BUILDING MATERIALS. — Brick and cement have advanced; other materials are steady at quotations.

RESIDENCES. — For Mr. Michael Duffy, 41 five-st'y houses, to be built of brownstone and brick, are to be erected on First Ave. and Ave. A, between Seventy-ninth and Eightieth Sts., from designs of Mr. Andrew Spence.

OFFICE-BUILDING. — The Mutual Life Insurance Co. will have a fire-proof office-building erected on the site of the old post-office building recently purchased by them; plans have not yet been decided on.

APARTMENT-HOUSE. — An apartment-house is to be built on Seventeenth St., w of Second Ave., for Mr. Thos. Osborne.

STEWART STORE. — The alterations and the raising two stories of the Stewart store, cor. Chambers St., will require five million brick.

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Work on the new St. Mary's School, at Garden City, will begin in the spring.

BUILDING PERMITS.—*Cherry St., No.* 359, four-st'y brick tenement, tin roof; cost, $5,000; owner, Ellen Abrahams, 189 Henry St.; architect, And. Spence.

Lewis St., No. 123, five-st'y brick tenement, tin roof; cost, $8,000; owner, Daniel F. Linehan, 294 Stanton St.; architect, Wm. Graul.

Mott St., Nos. 35 *and* 37, four-st'y brick factory, tin roof; cost, $7,000; owner, James Naughton, 46 Mott St.; architect, Andrew Spence.

Fifteenth St., n s, 95′ 6″ w Avenue B, five-st'y brick flat, gravel roof; cost, $50,000; owner, Hugh Smith, cor. Broadway and Thirty-fourth St.; architect, Stephen D. Hatch.

Twentieth St., n s, 225′ e Eleventh Ave., 4 brick buildings, foundry, pattern-shop, stable, core-rooms and ovens, gravel roofs; cost, $15,000; owner, James L. Floyd, 740 Greenwich St.; architect, Jos. M. Dunn; builders, Jeremiah Smith and Chas. E. Hume & Co.

West Fifty-seventh St., Nos. 514 *and* 516, six-st'y brick malt-house, tin roof; cost, $60,000; owner, Conrad Stein, 521 West Fifty-seventh St.; architect, Wm. Jose.

Seventh Ave., s w cor. Fifty-fifth St., six-st'y brick and stone apartment-house, slate and tin roof; cost, $55,000; owner, Estate of Edward Clark, James Meehan, exr., 215 East Sixty-first St.; architect, H. J. Hardenbergh; builders, Moran & Armstrong, and Grissler & Fausel.

Seventy-sixth St., n s, 225′ w Third Ave., two-st'y brick and stone church and rectory; owners, Trustees of Church St. John the Baptist, by Chas. De La Croix, 120 West Twenty-fourth St.; architects, N. Le Brun & Son; builder, Jas. Murphy.

East One Hundred and Fourteenth St., No. 170, one-st'y brick chapel, tin roof; cost, $5,000; owner, Elizabeth Lohr, on premises; architect, Gustavus Bofinger.

One Hundred and Sixteenth St., n s, 65′ e Third Ave., five-st'y brick flat, tin roof; cost, $15,000; owner, Chas. Laughran, 225 East One Hundred and Twenty-fourth St.; architect, And. Spence.

Lexington Ave., e s, from One Hundred and Sixth to One Hundred and Seventh St., and n s One Hundred and Sixth St., 83′ e Lexington Ave., 17 four-st'y brownstone front flats, tin roofs; cost, each, $19,000; owner, Sam'l H. Bailey, 186 East One Hundred and Fourth St.; architect, F. T. Camp, Jr.

Lexington Ave., n w cor. One Hundred and Seventh St., 9 four-st'y brick tenements and store, tin roofs; cost, corner, $15,000; others, each, $12,000; owner, C. Johnson, 101 East One Hundred and Nineteenth St.; architect, R. Rosenstock.

Second Ave., No. 1414, four-st'y brick workshop, tin roof; cost, $5,500; owner, Helen Fremberger, on premises; architect, Geo. Fremberger; builders, James Shannon and Geo. Fremberger.

Second Ave., w s, 120′ n One Hundred and Sixteenth St., 2 five-st'y brick tenements, tin roofs; cost, $10,000 and $13,500; owner and builder, Peter Somers, 1248 Park Ave.

Fourth Ave., s e cor. Eighty-seventh St., 4 five-st'y brick flats; cost, one, $16,000; three, each, $20,000; owner, Jennie I. Christie, 239 West One Hundred and Twenty-sixth St.; architect, Wm. Christie, builder, Louis Rossi.

Eighty-seventh St., s s, 102′ 9″ e Fourth Ave., 2 five-st'y brownstone front flats, tin roofs; cost, each, $20,000; owner, architect and builder, same as last.

One Hundred and Twenty-ninth St., n s, 175′ e Seventh Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $10,000; owner and builder, E. C. Coggeshall, 224 East One Hundred and Eighteenth St.; architects, Thom & Wilson.

One Hundred and Thirty-first St., n s, 135′ e Sixth Ave., 2 five-st'y brick apartment-houses, tin roofs; cost, each, $48,000; owner, John L. Brewster, 156 Broadway; architect, M. J. Merritt.

One Hundred and Thirty-ninth St., s s, 56′ w Morris Ave., three-st'y brick factory, tin roof; cost, $7,000; owner and builder, Ed. Gustaveson, One Hundred and Thirty-ninth St., w Third Ave.; architect, John Rogers.

One Hundred and Fortieth St., n s, 481′ 6″ e Alexander Ave., three-st'y frame dwell., gravel roof; cost, $4,468; owner, Samuel M. Pattison, 43 East One Hundred and Thirty-third St.; builder, Thos. Kepple.

Avenue A, n w cor. First St., Fordham, three-st'y frame dwell., tin and slate roof; cost, $4,000; owner, Christopher Boehme, Fordham; architect, Ernest Hoffmann.

ALTERATIONS.—*Fourth Ave.*, s w cor. Sixty-fourth St., four-st'y brick extension, tin roof; cost, $3,000; owner, Henry T. Smith, 58 East Sixty-fourth St.; architect, M. C. Merritt.

Wall St., No. 50, to be raised one story; cost, $25,000; owner, Royal Ins. Co., Benj. B. Sherman, chairman of Trustees, Nos. 31 and 33 Wall St.; architect, D. Lienau; builder, Wm. W. Owens.

White St., Nos. 83 *and* 85, to be raised one story; cost, $3,000; owners, William P. Dixon, et al., 29 Wall St.; architect, J. Morgan Slade.

West Thirty-fourth St., No. 428, three-st'y brick extension, and alterations in top floor and roof; cost, $4,000; owner, Julia R. Hunt, on premises; architect and carpenter, Sam'l McSkinin.

Portland, Oregon.

HOUSES.—Mr. Higgins is putting up a three-story brick house, 50′ x 80′; cost, $13,500: Mr. James Toley, contractor; Mr. J. Krumbein, architect.

Mr. F. Everding, a residence costing $4,000. Mr. W. H. Williams, architect.

Capt. Menzies is having plans prepared for a residence: cost, $2,500. To be built by C. W. Sears.

STORES.—Mr. Hamilton is building a four-story brick store, 50′ x 100′, on corner of —— St.; James Foley, contractor; J. Sherwin, architect.

Prinkman & Wolf are building a three-story brick building for business purposes; cost, about $16,000. R. Robinson, contractor: W. H. Williams, architect.

Geo. T. Greene is building a three-story brick building for business purposes, 50′ x 100′; cost, $32,000; Wm. Deburgh, contractor; J. Krumbein, architect.

HOTEL.—Messrs. Lewiston & Higgins are putting up a three-story frame building for hotel purposes; cost, $16,000. W. O. Anderson, contractor; Wm. Stokes, architect.

Philadelphia.

FREIGHT DEPOT.—*Beach St.*, n e cor. Laurel St., the Penn. R. R. Co. are about to build a one-st'y freight depot, 50′ x 200′; F. W. Tweed, contractor.

HOUSES.—Mrs. Mary Agnew is having erected on Cambridge St., below Sixteenth St., 4 dwells., 17′ 6″ x 40′; J. J. Deery, architect.

STABLE.—Dr. W. K. Brown has begun to build a stable and coach-house, 19′ x 25′ and 30′ x 32′ at Front and Diamond Sts.; John J. Deery, architect.

Frankford R'd., e s, n of Alleghany Ave., 2 three-st'y dwells., 16′ x 40′; Owen Mountney, contractor.

Penn St., cor. of Foulkrod St., 2 two-st'y dwells., 16′ x 40′; E. K. Welch, contractor.

BUILDING PERMITS.—*Second St.*, n w cor. Berks St., two-st'y store, 10′ x 50′; Jos. Parker, contractor.

Watt St., e s, n of Federal St., two-st'y dwell., 16′ x 28′; R. B. May, owner.

Edgemont St., e s, n of Anthracite St., two-st'y dwell., 16′ x 40′; Geo. McCouch.

Third St., w s, n of Venango St., 2 two-st'y dwells., 15′ x 40′; Wm. McCluskey.

Connaro St., s s, bet. Ridge Ave. and Mitchell St., 2 three-st'y dwells., 15′ x 28′; Chas. M. Horner, contractor.

North Twenty-first St., No. 222, three-st'y dwell., 20′ x 30′; Jno. Blackburn, owner.

Eighth St., n w cor. McKean St., 8 two-st'y dwells., 18′ x 44′; J. C. D. Smith, contractor.

Twenty-third St., cor. Cherry St., third-st'y addition to front and back building, 20′ x 45′ and 20′ x 50′; Richards & Shourds, contractors.

St. Louis.

BUILDING PERMITS.—Forty-seven permits have been issued since our last report, of which thirteen are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows:—

Missouri Car & Foundry Co., one-st'y iron-clad; cost, $5,000.

Missouri Car & Foundry Co., one-st'y iron-clad; cost, $6,000.

Missouri Car & Foundry Co., one-st'y iron-clad; cost, $4,000.

E. G. Scudder, dwell.; cost, $9,000; J. B. Legg architect; J. B. Lindsley & Son, contractors.

C. A. Katz, dwell.; cost, $5,000; O. J. Whilhelm, architect.

Dr. Thos. O'Reilly, store and dwell.; cost, $28,000; H. G. Isaacs, architect; P. Weber & Co., contractors.

J. Garvin, dwell.; cost, $2,500; S. H. Hoffmann, contractor.

St. Louis Mutual House-Building Co. No. 3, dwell.; cost, $2,848; Mortimer, architect.

St. Louis Mutual House-Building Co. No. 3, dwell.; cost, $3,173; Mortimer, architect; J. H. Dunlap, contractor.

J. Gilsler, dwell.; cost, $7,800; J. Ratz, contractor.

General Notes.

ALBION, N. Y.—County clerk and surrogate's office; cost, $25,000; J. G. Perry, Binghampton, architect.

E. K. Harts, pump factory, brick and cut stone; cost, $18,000; W. V. N. Barlow, architect.

Pratt Block, artificial stone front; H. B. Gleason, Rochester, architect; cost, $10,000.

Two-st'y dwell. for S. W. Smith; cost, $3,500; F. Goodnow, architect.

BRYN MAWR, PA.—Stone house for Geo. Vaux, Esq., two-and-one-half-st'y, 37′ x 70′, to be finished next May, (1883).

CHARLESTOWN, MASS.—The Committee on Fire Department has approved the plans for the new $25,000 engine-house to be located on Bunker Hill, near Main St., in the Bunker Hill District.

CHARLOTTE HALL, MD.—Chapel of Potomac-stone, with terra-cotta and blue-stone finish, 34′ x 70′; cost, $10,500; T. B. Ghequier, architect, Baltimore, A. M. Carroll, builder.

COLUMBUS, GA.—The Swift Manufacturing Co., of Nashville, have begun a new cotton mill.

DANVERS, MASS.—Queen Anne cottage for Postmaster Hood; cost, $4,000; H. W. Rogers, architect.

DORCHESTER, MASS.—Messrs. Ion Lewis & H. P. Clark are architects for a stable for E. G. Merrihew, on Melville Ave; also making additions to residence; Edw. C. Wheeler, builder.

ELM WOOD, ILL.—F. E. Barker, cottage; cost, $2,500; David S. Hopkins architect, Grand Rapids, Mich.

GIBBSBORO, N. J.—The corner-stone of the new P. E. Church, which will cost $6,000, has been laid.

HAVERHILL, MASS.—The First Baptist Church Society is building a $70,000 church.

HOPKINTON, MASS.—Last week the Congregationalists laid the corner-stone of their $30,000 church edifice, to take the place of the one destroyed by fire last April.

INDIANAPOLIS, IND.—The State House Commissioners have filed a report of the progress of work on the new State House, showing that the cost of the entire work, according to present plans and contracts, will be $1,762,207,58. This leaves the Commissioners a balance of some $239,000, which can be used, at their discretion, in making changes and improvements in the building. The third story will be reached when the season closes.

KANSAS CITY, MO.—The architect of the new city-hall, which will cost $20,000, is Mr. George Carman.

LAWRENCE, L. I.—A frame house is to be built for Mr. I. F. Scott, to cost about $8,000, from designs of Mr. H. Edwards Ficken, of New York.

LYNN, MASS.—Residence for F. S. Pevear; cost about $6,000.

Brick tenement-house for H. W. Gordon; cost, $9,000.

Brick factory, 40′ x 70′, three-st'y, for J. M. Taylor; cost, $5,600.

House for F. P. Drown, Queen Anne style; cost, $4,500.

Brick boiler-house, 40′ x 40′, and brick octagon chimney, 150′, for A. B. Martin & Co.; cost about $4,500.

Store for N. W. Edson; cost about $6,000.

Tenement-house for C. W. Wilson; cost, $6,200.

Residence for F. W. Cross; cost, $4,300.

Residence for C. W. Marsh; cost about $3,000.

Residence for C. A. Lovejoy; cost, $4,600; H. W. Rogers, architect for all the above.

MARION, MASS.—Alterations and additions to "Holly Lodge," Blake's Point, for Lyman R. Blake, Esq.; cost, $2,000.

RYE BEACH, N. H.—Queen Anne cottage for H. Sawyer; cost about $5,000.

RYE NECK, N. H.—A cottage is to be built for Mr. G. M. Taylor, from designs by Mr. Ed. H. Kendall of New York.

SHELBURNE FALLS, MASS.—Mr. J. T. Montgomery has offered to build a stone church for the Episcopalian Society. The building will have a seating capacity of about 300, and cost from $15,000 to $20,000. The work will be begun next spring.

SOUTHBORO, MASS.—H. H. Mawhinney & Co. are erecting a four-st'y brick shoe-manufacturing establishment at Fayville, Southboro.

WALLINGFORD, CONN.—Eight tenements for the workmen of the Wilson sewing-machine factory are to be built by W. W. Scoville, of Hartford.

WARWICK, N. Y.—Alterations and additions are to be made to the residence of Mr. R. P. Fowler, at a cost of $8,000; from designs of Messrs. R. C. Romeyn & Co.

WHEELING, W. VA.—Mr. S. M. Howard, of this city, is the architect of St. Luke's Episcopal Church, now building on the Island.

PROPOSALS.

BOILER FOR Q. M. STEAMER "RESOLUTE."

BOSTON, MASS., October 31, 1882.

Sealed proposals will be received at the office of the Depot Quartermaster, U. S. Army, No. 159 High St., Boston, Mass., **until 12 o'clock, M., of Thursday, November 30, 1882,** for the furnishing and fitting of a new boiler for the Q. M. Steamer "Resolute," plying in Boston Harbor.

Specifications of the work may be examined at the office above-named.

The Government reserves the right to reject any or all proposals, and preference will be given to an article of domestic manufacture, condition of price and quality being equal.

Envelopes containing proposals should be marked "Proposals for Boiler for Steamer 'Resolute,'" and addressed to the undersigned.

THEO. J. ECKERSON,
360 Major and Q. M. U. S. Army, Depot Q. M.

HOT-WATER HEATING-APPARATUS.

[At Paducah, Ky.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, November 4, 1882.

Sealed proposals will be received at this office until **12 M., on the 27th day of November, 1882,** for furnishing and fixing in place complete in the Court-House and Post-Office at Paducah, Ky., a low-temperature hot-water heating-apparatus, in accordance with drawings and specification, copies of which, and any additional information, may be had on application at this office, or the office of the Superintendent. JAS. G. HILL, Supervising Architect.

PENSION OFFICE-BUILDING.

[At Washington, D. C.]

OFFICE OF SUPERVISING ENGINEER AND ARCHITECT. DEPARTMENT OF THE INTERIOR.
No. 1316 N Street, n w.
WASHINGTON, D. C., November 1, 1882.

Separate sealed proposals will be received at this office till **noon on Saturday, the 2d day of December, 1882,** for furnishing and delivering at the site of the new Pension Building on Judiciary Square in this city, foundation stone, broken stone for concrete, bricks, cement, lime, sand, coloring matter for mortars, terra-cotta consoles, brackets and pilaster caps, and for excavation and grading, for all labor in laying concrete foundation, for all labor in building foundation and cellar walls of rubble-stone, and for all labor in laying bricks required for the construction of a fire-proof building for the United States Pension Office. Specifications may be obtained from this office.

M. C. MEIGS, Supervising Engineer and Architect.
361 Bvt. Maj.-Gen'l. U. S. A.

YELLOW-PINE TIMBER.

NAVY PAY OFFICE,
17 State St., NEW YORK, October 31, 1882.

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359 Pay Inspector U. S. Navy.

GLASS.

[At St. Louis, Mo.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 8, 1882.

Sealed proposals will be received at this office **until 12 M., on the 23d day of November, 1882,** for furnishing and delivering, ready for fixing in place, all the plate, double-thick sheet and double-thick ground glass, required for the Custom-House and Post-Office at St. Louis, Mo., in accordance with specification, schedule and diagrams, copies of which and any additional information may be had on application at this office or the office of the Superintendent
360 JAS. G. HILL, Supervising Architect.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL XII. Copyright, 1882, JAMES R. OSGOOD & CO., Boston, Mass. No. 360.

NOVEMBER 18, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE new Pension Office in Washington, for which the ground has already been broken in Judiciary Square, is to be built under the very able direction of General M. C. Meigs, who, we need hardly say, has had great and varied experience as an architect. The Act authorizing the work limited the cost of the building to four hundred thousand dollars, at the same time directing that it should be made fire-proof; and these requirements General Meigs intends to comply with strictly. The structure is to be rectangular, four hundred feet long, and two hundred deep, and will contain a large central hall surrounded by three stories of lofty rooms, carrying the cornice to a height of seventy-five feet above the pavement. The exterior is to be of brick, with dressings of moulded brick and terra-cotta. The first story is plain, separated from those above by a rich band of terra-cotta; the second and third stories are ornamented with window-dressings in the same material, with portions in moulded brick; and terra-cotta string-courses will mark the stories and connect the various parts of the composition. The openings are large, and the Italian character of the fenestration is kept also in the deep "cornicione," of brick and terra-cotta, which crowns the walls. Inside, the building has the same sincere and durable character as on the outside. The galleries surrounding the central hall are of brick, resting on brick arcades, supported by two tiers of iron columns, of simple design. The roof is of iron, and the central cortile is lighted by vertical windows in the upper portion of its walls, which are carried up above the rest of the building for the purpose, as it seemed desirable to avoid admitting the vertical rays of the summer sun by sky-lights. With the same intention of keeping the rooms at a temperature as nearly uniform as possible, all the outer windows are to have double glazing, two sheets of glass being set in the same sash, separated by an air-space of an inch or more. The floors are to be of brick and iron, with an upper flooring of wood or similar material, for the greater comfort of the fifteen hundred clerks employed in the building. Taken altogether, the building bids fair to be one of the most interesting objects in Washington, and those of our younger readers who have the opportunity to visit the Capital within the next two years should not fail to go and see its construction. The sum for which it is to be built, amounting only to five dollars for every square foot of ground covered, is very small for a fire-proof building, but the lesson to be learned from it will be none the less useful, as showing the dignity which can be given to simple materials in the hands of one who knows how to use them.

A DREADFUL tragedy occurred last week at Halifax, Nova Scotia, where thirty-one people were burned to death in the city alms-house without any chance of escape. About midnight a smell of burning wood was observed in the building, which was traced to the bake-house in the basement, but the danger not seeming to be immediate, no steps were for a time taken to remove the inmates. The smoke spread through the various stories, but no flames were seen, and the officers of the establishment being engaged in pouring water into the basement, the doors were not even unlocked until a fireman broke down one of them with an axe, allowing most of the inmates to come out. Just at this moment, however, the fire creeping through the basement reached the foot of the elevator-shaft, and almost in an instant burst out with great fury in the roof. The upper story was used as a hospital, and contained about seventy patients. About half of these were brought safely down the long winding stairs before the fire rendered approach impossible, but when this retreat was cut off, nothing could be done but to look on and see the rest die in agony.

A DELAY of several weeks was caused in extending the service of the Edison Electric-Light Company in New York by an unforeseen and singular difficulty. The station from which the lights in the first district are operated is situated in Pearl Street, and the current is generated by means of immense dynamo-electric machines driven by steam-engines of two hundred horse-power each. Each dynamo-machine with its engine is capable of furnishing a current for fourteen hundred lights, and twelve of them will be needed for supplying the district. Of these six are in place, and the Company, by the rapid additions to the number of lamps which it was making, soon found it necessary to bring into service a second machine, besides the one which had supplied those first put in operation. Two were accordingly connected with the main conducting-wire, and set in motion, but with a result very different from that which was intended. Every one who has seen a dynamo-machine and an ordinary electric-motor will understand that under certain circumstances they may be convertible, the one into the other, and it was found that in case of any difference of speed between the two engines, this took place with the Edison machines, the one more rapidly driven taking all the work, and the other suddenly assuming the functions of an immense electro-motor, operated by the current derived from its more industrious companion. In this way first one engine, and then the other, would run at an excessive velocity, which could not be controlled, since it was the result of a reflex action of the current, and was quite independent of the steam power from the boiler. One of the engineers was much alarmed on first finding his engine running at lightning speed after the steam was shut off, and all natural agency apparently withdrawn, until the matter was explained to him. An automatic regulator by which all the engines could be run in perfect unison was, however, soon devised, and the difficulty is said to be completely overcome. Another alarm was caused to the men employed in the station by the instantaneous melting and evaporation of some six or eight pounds of copper on the doubling of the current by coupling the engines. The air of the room was filled with the vapor of the metal, nearly suffocating the inmates, who groped their way to the windows in terror.

THE holding of the Convention of the American Institute of Architects in Cincinnati seems to have stimulated the whole profession in that city to a zeal which is likely to have the best results. Already an association has been formed among the young men in the various offices, with a view to mutual improvement, and every Saturday afternoon some building in process of erection is to be selected for a visit under the guidance of one of the older architects. This excellent idea originated with the members of the Cincinnati Chapter of the Institute, and upon them will fall most of the self-sacrifice needed to carry it out successfully, but they are disposed to make the effort, and will find their reward, we hope, aside from the consciousness of good actions performed, in the increased intelligence and interest of their assistants.

A CORRESPONDENT sends us a copy of a circular to architects, inviting, or rather, graciously consenting to receive, competitive plans for a school-house, to cost thirty thousand dollars, upon the condition that "the plan finally adopted will be the only one for which any compensation will be given," and that "the successful competitor" shall furnish, in addition to his plan, detail drawings and specifications, for which "will be paid the sum of three hundred dollars." Our correspondent seems to think that there is something wrong, or injudicious, or ridiculous about such an offer, but in this we cannot at all agree with him. A buyer is not to be blamed for offering an unreasonably low price for anything that he wants; it is the

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seller who accepts it that makes himself ridiculous, and all the more if he tries, too late, to throw the blame of his own folly on the one who tempted him. As we have often said before in similar cases, the school-house in question must, sooner or later, be planned by some architect on his own terms, and the invitation of the committee, being addressed to the profession, simply puts the profession collectively in the place of an individual. If the profession believes that the plans and specifications called for are worth a thousand dollars instead of three hundred, it has only to wait until the thousand dollars is offered, as it surely will be if they cannot be had for less. At the present day the work of skilled architects cannot be done by any one else, and they need find fault with no one except themselves if they are not properly paid for it.

The New York elevated railroads seem likely to meet with complete defeat in their endeavors to show that they should not be obliged to pay damages to the owners of property which has plainly been injured by their construction. In the case of Mr. Story, whose claim for compensation for the privileges of air, light, and unencumbered passage along that part of Front Street adjacent to his estate of which the elevated railways had deprived him, was decided in his favor a few days ago, no further resistance is to be offered, and the railway company has petitioned the Supreme Court for the appointment of commissioners to fix the amount to be paid to Mr. Story for relinquishing his rights. In the suit of the heirs of Dr. Caro, who is said to have died of vexation at the delays in granting him compensation for the construction and operation of the road in Fifty-third Street, the General Term of the Superior Court has refused to modify its previous decision, which was unfavorable to the railway company, and the question is now to be submitted finally to the Court of Appeals. Even if the decision should be again adverse to the Company, as it probably will be, the aggregate amount which it will be obliged to pay, if all the aggrieved property-owners on the line should make claims, is not likely to be very large. In the wide avenues uptown the railways have as a rule increased the value of property near which they pass, and it is only in the narrow streets in the lower part of the city, where the obstruction of light and air is a serious matter, or in a few streets now occupied by dwelling-houses, that any material depreciation can be shown; and if the roads were permitted to assess the owners of property whose rental they have increased two or three fold, to offset the damages paid to those who are injured, their outlay would be reimbursed ten times over.

After three years of ineffectual endeavor to gain permission to build an elevated railroad in Boston, Captain Joe V. Meigs, the inventor of the single-rail elevated road which bears his name, intends, it is said, to obtain incorporation for a company to build and operate a line on his system elsewhere in Massachusetts. The principle of the Meigs road is simple enough, and there is no apparent reason why it should not answer an admirable purpose. Instead of a double line of posts, carrying lattice-girders, cross-ties and rails, the track is reduced to a single row of posts carrying one line of girders. Cross-ties are entirely dispensed with, and the track occupies in plan about one-tenth the space necessary for the elevated roadway of the usual form. The upper and lower chords of the girders are both utilized as rails, the main wheels of the cars being set like the letter V, with their tires meeting on the lower chord, while the upper chord forms the track for small wheels, with deep flanges, which prevent any lateral movement of the car. All the conditions of stability seem to be fulfilled in this arrangement, and it would be infinitely more difficult to throw such a car off the track than one of the ordinary kind. The locomotive designed to draw the cars has the peculiarity of being impelled by horizontal driving-wheels, which clasp the upper rail with a force which can be regulated at pleasure by the engineer, who is thus enabled to control his train in starting and stopping with a certainty impossible in the case of locomotives which depend on friction alone to hold their wheels to the track. The weakest point in the scheme seems to lie in the mode of switching trains from one track to another. Anything like the ordinary switch is of course impossible, and a substitute is found in hinging one girder so that its free end can be shifted in any direction. With ordinary trains, the distance to which it would be necessary to move the free end would be likely to make the angle between the switch-girder and the other portion of the track too great to be passed with safety, but the new plan is said to admit of sharper turns than any other. If the experiment should prove successful, the system may come into extensive use. The cost of a road so constructed, for equal strength, is much less than that of a surface railway, and the saving in expense of grading and bridging by the employment of posts would amount to a further large sum, while the outlay for maintenance, particularly in snowy regions, would certainly be no more than under the old system, and probably somewhat less.

A noble mansion of the century before the last is now in process of demolition in Paris, and has yielded an extraordinary amount of curious and valuable débris. At the first dismantling a hoard of three hundred thousand francs in ancient coins was discovered, and the modern finish has elsewhere proved to conceal works of art. Behind the panelling of one of the reception rooms were found some beautiful frescoes, in sufficiently good preservation to be readily removed. These are valued at twenty-five thousand francs, and some carved oak panels, discovered in a similar situation behind the wainscoting of another room, were sold on the spot for seventy-five thousand. The mantels and the staircase, which were all of marble, have been sold at high prices, and even the doors and other portions of the wood-work were eagerly bought up. The timber of the roof, which was of oak, seasoned by its centuries of exposure, was sold to carvers at a price much higher than that of new wood, while the lead covering of the roof brought ten thousand francs as old metal. The plates were so thick that special tools had to be sent for to cut them off the roof, and readers of Viollet-le-Duc will remember that the lead of old roofs, from which the silver has not been separated, is much less easily corroded, and is therefore more valuable, than the modern product. The total sum thus far obtained by the contractor for the old materials of the building is said to be one million, one hundred thousand francs, or two hundred and twenty thousand dollars; a result entirely due to the excellence of material and solidity of construction, as well as the artistic workmanship, of everything about it.

Some of the superior class of journals are now amusing themselves by sarcastic comments on the attempt which is reported to have been made in the Church of St. Denis, the burial-place of the kings of France, to discover the treasures supposed to have been hidden there, by means of the divining-rod. The implement used by Mme. Caillavat, the person who obtained permission to make the search, is said to be a wooden bar, containing a tube filled with a mysterious composition, which was bequeathed her by some wizard, but all her magic arts have so far proved insufficient to reveal any object of value. By some of the critics this poor old lady's wand is classed with the witch-hazel stick once so much used for tracing underground springs, as a curiosity of ancient and obsolete superstition. So far as the hazel-twig is concerned, the notion that the belief in its efficacy in finding water has passed away is quite erroneous. Many a professional well-digger still employs it as one of his regular tools, and it is by no means the oldest and least intelligent men in the business who have the most confidence in its practical value. As this particular superstition plays such an important part in a pursuit which is otherwise sufficiently prosaic, it seems as if a scientific investigation into the subject might possibly lead to interesting results. A theory which has been brought forward to explain the dipping of the forked twig toward subterranean water-courses is that such water-courses, forming the natural conductors of electrical currents in the ground, indicate their presence in the atmosphere above them by other electrical currents, perhaps caused by induction, and opposite in direction to the underground ones, or perhaps depending simply on the tendency of the atmospheric electricity to pass quietly into the earth by the shortest path. How the witch-hazel stick can feel and indicate these currents is another question; but if they exist they can certainly be detected and measured by the galvanometer, and the demonstration of their existence or non-existence would have some value. Another of the superstitions in regard to witch-hazel is that it will show the spot where lightning has struck, and this, if it has any foundation, may be connected with its other property, since lightning would usually find its way into the earth by the course offering the best and nearest conducting bodies.

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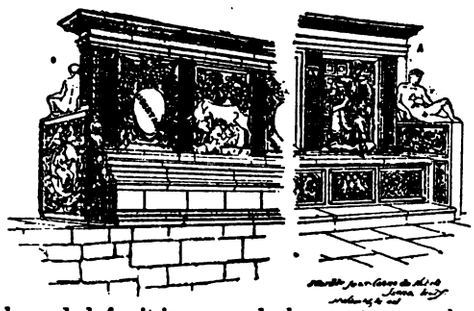
ANNUAL ADDRESS BEFORE THE AMERICAN INSTITUTE OF ARCHITECTS.[1]



THE pleasant duty has been given me to deliver the opening address upon the occasion of your sixteenth annual meeting.

If, as a citizen of Cincinnati, it were simply to extend to you words of greeting, my office would soon be ended, for it is easy and pleasant to say welcome. As a layman, with no pretense of technical knowledge of the art and science of architecture, I might well approach its discussion with grave hesitation. As one of the fine arts, perhaps of all the fine arts, it has my profound admiration and respect, and I make bold to offer a few considerations which may be of interest to your honored Institute. Architecture, in its monumental, as well as in its inferior forms, more than the arts of sculpture and painting, has direct influence even upon the health, if not the pleasure of mankind, and far more than they is allied with and is inseparable from human industry. In truth, industry was born with primitive architecture. When man first felt the need of protection from the inclemency of the weather, he invented tools to assist his own weakness and overcome the difficulties of construction. The history of the race shows unceasing invention of implements and constant alliance between architecture and industry. It has also taught us that architecture is the first of the arts, for it was the first evidence of social organization, of permanency in place of a primitive nomadic existence. The hovel of mud took the place of the tent of skins. Following the hovel came the village and the city, with graceful palaces and majestic temples. The tribe has become a nation, and so the work of the architect tells the history of the civilized world, and more directly the history of industry, but most eloquently does it record the development of the law of the beautiful. In that masterpiece of incomparable value, the "Grammaire des Arts du Dessin," Charles Blanc says: "Deprived of its beauty, an edifice may be a work of industry; it is not a work of art. The definition of architecture enforces the law of being beautiful." Emerson somewhere says that "all construction without beauty is egotism." It will not be disputed that architecture in a certain sense stands higher than its auxiliary arts of painting and sculpture, yet painting and sculpture in their isolated and higher expression are more ideal; they give wider range to the imagination. In their lower and industrial forms as decorative and useful arts they sometimes dominate architecture, degrading it from its simplicity and dignity. Industry itself is debased by this intrusive intervention, while the arts of painting and sculpture descend from their high æsthetic plane. In our day, painting and sculpture enter but little into architectural construction. The industries governed by these arts are more largely engaged than ever before.

This is neither the time nor place, nor have I the inclination, to criticise or discuss at length the modern architecture and the decoration of public and private buildings. They present to us in all our towns and cities much that is good and beautiful, as well as frequent shocking incongruities, dire offenses against the laws of symmetry and harmonious color.

The taste and physical needs of modern society call upon all the industries to aid in building monumental structures as well as those for the home and for commerce. An architect who designs on edifice without taking into account the industrial element required to build it would meet with failure and disgrace. Of all the professions that of architecture demands the most general and exhaustive education. The architect must not only be an artist, but know how to be an artisan of all trades. In the annual gathering of your Institute many of the questions I have ventured barely to suggest have been the subject of learned and exhaustive discussion. You are striving to raise the standard of your profession by mutual labor, by criticism, by example. Some of you are engaged in the noble work of teaching. It seems to me the schools of architecture in Boston, New York, and at the Illinois University are among the most valuable of all your educational efforts. The schools of technology and of design in this country, directly and indirectly, assist in preparing the student for practical employment as an architect. The importance of this technical knowledge can not be over-estimated, yet I think the tendency of building in this country is to dominate the æsthetic by the industrial element. The definition of Charles Blanc, that architecture enforces the laws of the beautiful, is ignored. Oftentimes, it is to be feared, it is not known.

I know the difficulties the architect is obliged to overcome. Such as the stupidity and caprice of the owner, who has already drawn a plan of an impossible house, or, what is worse, the committee, whose every member has a pet scheme, while all of them are buzzing in the ears of the architect like a swarm of angry yellow-jackets. Sometimes the house-owner is a man of taste and knowledge, and committees are intelligent, having a general idea at heart of what they need. Every man ought to impress upon his home his own individuality. Often, however, he places himself unreservedly in the hands of the architect, the decorator, and upholsterer, and between the three there is incongruity. The brain that designs the structure should control its interior decoration.

The architect must consult his principals, but by concessions to bad taste he too often sacrifices his self-respect. In monumental structures, such as churches, museums, and public buildings, where the laws of symmetry and grace exceed the requirements of use, the architect must not yield his convictions, but stand to his art. Is it not within the province of your Institute to go yet farther than this? When buildings are constructed by Government at the expense of the public, if they are gross violations of architectural law may you not express disapproval? We stand to-day under the shadow of a national edifice of this character, while its ungainly companions in other large cities offend the face of heaven. Cannot this learned and powerful body influence the national Government and save us from these inflictions?

A perusal of that admirable report by Prof. Ricker, made at your meeting a year ago, appears to confirm the impression that the course of instruction at the Illinois University, if not at Columbia College and at Boston, sacrifices the æsthetic to the industrial. Some years ago I read in the *Chronique des Arts* the report of a two days' discussion in a congress of architects at Paris, where it was finally decided that the student of architecture, before entering the atelier of the architect, or at least supplementing his labor there, should pass through a thorough study of drawing, and especially he should be able to draw the human figure. There is no doubt, of all things that exist the nude human figure best represents harmonious proportions and symmetry of form. How many students of architecture—indeed, how many professional architects—are there who can accurately depict what we are told was made after God's own image? The architect's atelier is usually utterly barren of objects of taste and beauty. It contains nothing to kindle the imagination and inspire the poetic sense. It ought to be filled with classic statuary, graceful vases, natural flowers, with their glowing harmonies of color, and a thousand objects of grace and beauty. If the architect desires to be something more than the carpenter, mason, or engineer, he must constantly cultivate, at least by his surroundings, the sense of the beautiful.

We have seen how intimate is the alliance between the arts of architecture, painting, and sculpture. If time permitted I would be glad to discuss the relations of music to architecture. Some one has entitled architecture as "frozen music," a figure of speech too far-fetched to be called even a poetic license. It may be said that a point of union exists between these arts in the science of numbers, the vehicle by which both are born, but there is a yet closer alliance in the fundamental laws of symmetry; the necessity for just and harmonious proportion of all the parts. These laws cannot be violated in architecture without harm. They are often disregarded in music by composers of unquestionable genius. Wagner, Liszt, Berlioz, and a host of smaller men indulge in frequent inconsistencies, sometimes building their temples of music upon the apex rather than upon the base; but the classical composers, such as Haydn, Mozart, and Beethoven, rarely violated the laws of symmetrical progression. With them the work of art is built out of the smallest parts, which grow in geometrical proportion up to a perfect whole. The smallest division of form in music is called a bar or measure. The symmetry of the composition of the masters of the classical period may be made comprehensible to the eye. In the diagram before you, which has been kindly furnished me by Prof. Singer, of the College of Music, is, you will find, a brief but complete example of this symmetrical construction. The smallest curves uniting two points indicate the single groups of two measures; the larger curves, groups of four; the yet larger comprise whole phrases of eight bars. The model which is here presented as an illustration of the laws of musical symmetry is a passage from Mozart's Symphony in G minor. I might easily multiply examples of exquisitely constructed architectural forms in music. Out of Beethoven's masterly Eroica Symphony could be built a Gothic temple of majestic proportions, with decorations of infinite beauty, but the limits of this hour force me to resist the fascinating temptation. In the suggestions I have made for the instruction of the student of architecture the study of music has not been named, and I have no doubt Professors Ware and Ricker would hesitate before including that art in the curriculum of their schools, yet that study may be earnestly commended to the architect, the painter, and the sculptor. Of all arts it is the most ideal; more than the others it excites the imagination, refines the taste, and elevates the soul. It is one, at least, of the paths which lead to that high æsthetic plane where every true artist should aspire to stand. The true artist is not an egotist. He works not only for to-day—his creations are for the ages.

I think it was Montesquieu who said "Peaceful people have no history." In some degree this is true. Written history records the deeds of the conqueror. Wars are sternly fixed in the memories of the people and are perpetuated by the scribes, while generation after generation where peace and order reign are forgotten. But peace is the mother of art, and art is imperishable. When the bones of warriors and kings are but as the dust of the wayside, when the

[1] Delivered October 26, 1882, by Colonel George Ward Nichols, of Cincinnati, O.

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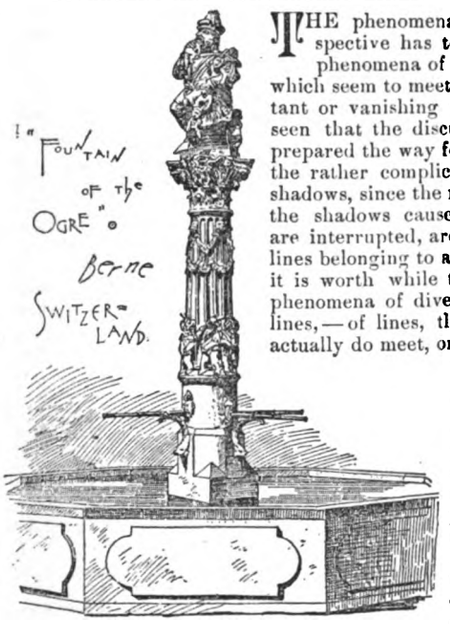
glory of empire has gone with its broken sword and trailing banners, when civilization itself goes out in the darkness of a long night, art remains ever fresh and verdant. Above the sands of the desert, midst the wreck of effete peoples, the obelisk rises in its simple dignity; the Parthenon remains the type of stately majesty; the Antinous and Venus de Milo are as beautiful as when chiselled by the artist's hand, while the potter's vase emerges from the ashes of buried cities pure and perfect as when it received the proud inscription, "Egotinous made me—Clitias painted me." Art is its own historian. The warrior, statesman, and merchant live chiefly in the artist. The works of labor die—the work of art lives forever.

PAPERS ON PERSPECTIVE.—XV.

DIVERGENT AND CONVERGENT LINES.—REFLECTIONS.



THE phenomena with which perspective has to do are mainly the phenomena of parallel lines—lines which seem to meet at an infinitely distant or vanishing point, and we have seen that the discussion of such lines prepared the way for the elucidation of the rather complicated phenomena of shadows, since the rays of the sun, and the shadows caused when these rays are interrupted, are also parallel right lines belonging to a single system. But it is worth while to examine also the phenomena of divergent or convergent lines,—of lines, that is to say, which actually do meet, or tend to meet, at a point which is within a finite distance. These phenomena so closely simulate the phenomena of parallel lines that we may well inquire just how far the resemblance extends. Moreover, just as the sun and moon cast parallel shadows, every terrestrial source of light, being at a finite distance, casts divergent shadows, and it is a matter of practical importance to find out just how they go and what becomes of them.

296. Now just as parallel lines *seem* to converge, and look exactly as if they were radiating in every direction from some point not very far off, situated upon the line between the eye and the infinitely distant vanishing point, so lines that *do* radiate from a point more or less distant look exactly as if they were parallel lines going off to infinity. And as a perspective drawing has to do only with the appearances of things, it represents the two classes of phenomena in exactly the same way. All it can do in either case is to show a system of right lines, all meeting, or tending to meet, at the same point. The point which thus simulates a vanishing point we will call the *apex* of the converging lines.

297. This consideration leads at once to the solution of a question in itself somewhat puzzling. If the apex, or point in which the lines meet, is in front of the spectator, it is easy enough to draw the lines of the convergent system radiating from the perspective of the apex, like the spokes of a wheel. But what shall we do if the apex is behind us, the lines being divergent, passing, so to speak, over our head and around our shoulders, and, as they recede from us in front, separating from each other more and more. Such are the rays emitted by a candle set behind one's back, and the shadows cast by it. What becomes of these divergent beams? Where do they seem to go? How shall their perspectives be drawn—so much of them as extends beyond the plane of the picture—upon that plane?

298. The observation made just now as to the exact resemblance between the phenomena of divergent or convergent lines, and the phenomena of parallel lines, affords a hint of the answer to this question. Parallel lines have two vanishing points, 180° distant one from the other, upon a line passing through the station point. If the spectator, looking in the direction of the parallel lines of the system, sees one of these vanishing points directly before him, the other will be directly behind him, and on turning right-about-face he will see that instead. So with the rays of the sun: one vanishing point is in the sun itself; the other, as we have seen, is in exactly the opposite direction, namely, in the shadow of the spectator's head.

But as divergent lines exactly simulate these phenomena, and cannot in fact be distinguished in appearance from parallel lines, except by some extraneous indication, they too will seem to have a second point of convergence, opposite the apex, towards which they seem to tend, and when the spectator turns his back upon the apex and looks in exactly the opposite direction, he will see the position of this false apex directly before his eyes. So with rays of a candle or any source of artificial light: if he faces it, the rays converge upon it; if he turns his back upon it, they seem to be directed towards the point exactly opposite the candle. This point, as before, is to be found in the shadow of the spectator's head, in that part of the shadow, namely, that we may call the shadow of his eye. That lines diverging from a point behind the spectator must seem to converge towards a point in front of him is plain; for if we suppose a line to pass through the eye in any direction, all lines lying in planes that pass through this line will seem to be directed towards one or the other of its vanishing points; but the line drawn through the station point from the apex of these divergent lines is such a line passing through the eye, and the divergent lines are lines lying in such planes. They necessarily tend, either way, towards the vanishing points of the line

299. Figure 77, Plate XVII, illustrates these points and also brings into notice the curious phenomena that present themselves when the apex or point of convergence is neither behind the spectator nor in front of him, but, so to speak, alongside; that is to say, is just as far from the plane of the picture as he is himself. Let S be the station point, $p\ p$ the plane of the picture, and 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 the right lines lying in a horizontal plane somewhat below the level of the eye, one end of each touching the line $p\ p$ in plan, and the ground line $g\ l$, in the perspective view above. A simple inspection of the figure shows that the parallel lines 1, 2 and 5 have their vanishing point at V^L; 3, 4, 6, 8 and 9, which are perpendicular to the plane of the picture, have their vanishing point at C; while 7 and 10 have theirs at V^R. Moreover, the lines 1, 3, and 7, which converge upon A_1, behind the station point, and which accordingly appear to the spectator at S to be divergent, have their perspectives directed towards A'_1, the false apex, a point in space exactly opposite the apex itself, and as far above the horizon as the apex A_1, on the ground, is below it.

The lines 5, 6, and 7, which converge upon A_2 the apex in front of the spectator, are shown in perspective meeting at the perspective of A_2.

300. Finally, the lines 5, 8, and 10, which have their apex at A_3, a point just as far from the plane of the picture as the station point, have their perspectives *parallel*. The same is true of the lines 2, 4, and 7, which converge upon the horizontal projection of the station point at S. But these last lines are not only parallel but *vertical*.

301. It appears, then, that if converging lines have their apex, or point of meeting, in front of the spectator, their perspectives will converge upon the perspective of their apex; if it is behind the spectator, they will converge upon a point which we have called their false apex, situated exactly opposite the apex itself, and which is the vanishing point of a line drawn through the apex and the station point; if the apex is neither in front of the spectator nor behind him, but just as far from the picture as is the station point, the perspectives of the convergent lines will be parallel. Their position depends upon the height at which the apex lies, and is most easily determined by finding the perspective of that element of the convergent system that is perpendicular to the plane of the picture (such as line 8 in the figure), and making the rest parallel to that. Finally if the apex is directly above or below the station point, the perspectives of the convergent lines will be vertical. If it is on a level with his eye, they will be horizontal.

302. Figure 78, a sketch, somewhat reduced in scale from an old English print, illustrates this last point. It shows three streets converging upon the point occupied by the spectator. The axes of these streets are all drawn vertical and parallel.

A similar result would follow if one were to draw the spokes of a large wheel while standing upon the hub. They would all be vertical and parallel. So with the reflections of distant lamps which at night often seem to cross the water and converge below the feet of a spectator standing upon a bridge. In perspective they also would all be drawn vertical and parallel, continuing, indeed, the vertical line of the lamp-posts from which they emanate, as is seen in Figure 79.

303. Figure 80 shows that the position of the false apex may most conveniently be determined by finding the perspectives of two horizontal elements of the converging series, a and b, one perpendicular to the plane of the picture, and one passing beneath (or above) the station point. Let a' and b' (or a'' and b'') represent the points in which these lines pierce the plane of the picture, their distance from the horizon depending upon the position of the apex, A, below or above the eye, and the other element of their position being obtained from the orthographic plan. The perspective of the line a will begin at a' (or a''), and be directed towards its vanishing point, C; that of the line b will begin at b' (or b''), and be vertical, since it passes directly below (or above) the station point (301). The point A' (or A'') where these perspectives would meet, if prolonged, is the position of the false apex.

The same result may be obtained by the methods of descriptive geometry, as may be seen in the same figure. The false apex is the vanishing point, as has just been seen (298), of that element of the converging system that passes through the eye. But the vanishing point of a line passing through the eye, and which is consequently seen endwise, is the point where it pierces the plane of the picture. Now b, in Figure 80, is the horizontal projection of such a line, and a' A' (or a'' A'') its vertical projection. A' then (or A'') is the point where it pierces the picture, its vanishing point, and the false apex in question.

304. Figure 77 furnishes other illustrations of the false apex besides those already mentioned. The points of convergence, A_4, A_5, and A_7, situated behind the spectator, have each a false apex, towards

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which the perspectives of the converging lines are directed, as may be seen at A_5', A_6', and A_7'.

A_5, A_6, and A_7 are supposed to lie in the same plane as do A_1, A_2, A_3, and A_4, previously discussed. It will be observed that the most distant of them, A_6 and A_7, have the apex nearest the horizon, the nearer ones, A_1 and A_5, farther off, and those on a line with the spectator, A_3 and A_4, at an infinite distance, the perspectives of the converging lines being parallel.

If either apex were in a different horizontal plane, the vertical position of the false apex would change accordingly, that of A_7, for instance, appearing at A_7'', if the point of convergence were as far above the spectator's level as it has been supposed to be below it.

GIRDERS. — VI.

III. — APPLICATIONS TO PRACTICAL EXAMPLES.

EXAMPLE 1. Loading as in Case 1, Figure 1.

Required the dimensions of a girder of white-pine, 28 feet clear length, to support a centre load of 8 tons as in Figure 1.

Girder to be a single timber.

We have already found the maximum bending moment M to be 56 foot-tons, for this case.

Shear is uniform and = 4 tons.

Let $f = 5$ = factor of safety.

Let $r = .03$ = maximum permissible deflection per foot.

For a rectangular section, $d' = d \div 2$.

For white-pine; $S = 1.24$; $E = 858.$; $B = .219$.

1. BREAKING.

Applying formula 4,

$$I = \frac{M f d'}{1.5\ B} = \frac{56 \times 5 \times d'}{1.5 \times .219} = 852.5\ d' = 426.3\ d.$$

2. BENDING.

Applying formula 7,

$$I = 144\ \frac{M L}{E r} = \frac{144 \times 56 \times 28}{.858 \times .03} = 8775.$$

As the section is to be rectangular, substitute these values of I in formula 10.

$$426.3\ d = \frac{b\ d^3}{12}, \text{ for breaking.}$$

$$8775 = \frac{b\ d^3}{12}, \text{ for bending.}$$

Suppose that b be assumed to = 16 inches.

Solving the two equations for d, we obtain:

$d = 17.12$ inches for breaking.

$d = 18.74$ inches for bending.

Hence the last must be taken, because it is largest.

3. SHEARING.

Applying formula 9, $A = \frac{W' f}{S} = \frac{4 \times 5}{1.24} = 16.13$ square inches of section required to resist shearing. Hence $16.13 \div 16 = 1.01$ = additional depth in inches required.

Therefore, $18.74 + 1.01 = 19.75$ = total depth of girder. It should be made 16 × 20 inches, and of uniform section from end to end.

(N. B. For a girder of uniform section, with a load either concentrated at centre or uniformly distributed, the dimensions of section can be directly obtained by applying the following formulæ, without drawing the equilibrium polygon and finding M and I.

1. BREAKING. $b\ d^2 = \frac{W f L}{B}$. (21.)

2. BENDING. $b\ d^2 = 432\ \frac{W L^2}{E r}$, for concentrated load. (22.)

$b\ d^2 = 270\ \frac{W L^2}{E r}$, for uniform load. (23.)

If it be required to find the dimensions of sections at different points in the length of the girder, corresponding to the strains there acting, the following process may be employed.

Divide the length of the girder into any number of equal or unequal parts, for example, 8. Measure the corresponding intercepts at the points of division, multiply each by the pole distance, thus finding the moments acting at the points. The depth to resist the bending moments can then be found by applying the same formulæ as before. The additional depth for shearing is then found and added at each section as before.

This has been worked out for the example, and the results are shown in Figure 87, which is a side elevation of the girder, the required depth for resisting bending moment and shearing being indicated by the dotted lines. Figure 88 is the section.

Example 2. Loading arranged as in Case 2, Figure 2.

Girder to be single, also of white-pine, breadth 16 inches.

Maximum bending moment M has been found = 55.04 foot-tons.

Maximum shear between left end and the load = 4.57 tons.

Applying the same formulæ as before, we obtain the following:

Depth required to resist bending moment =	18.64 inches
Depth required to resist shear =	1.15 inches.
Total minimum depth under the load =	19.79 inches.

The girder would be made 16″ x 20″ as in the last case.

This girder is shown in Figures 89 and 90.

Example 3. Loading as in Case 3, Figure 3.

Girder to be single, but to be of spruce.

As the loading more nearly approaches a uniformly distributed load, than one concentrated at centre, we apply formulæ 4 and 8.

Let $f = 5$; $r = .03$, as before.

For spruce; $S = 1.63$; $E = 783$; $B = .245$.

The maximum value of M has been found = 47.92.

Applying formulæ 4, 8, 9 and 10, as before, we find:

Depth required to resist bending moment M =	19.76 inches.
Depth for resisting shearing =	.46 inches.
Total minimum depth of girder =	20.21 inches.

As this is calculated for a uniform load, and the actual load is intermediate between a concentrated and uniform load, requiring smaller values of I and d than those found, a timber 16″ x 20″ would be sufficient. The shear which is here to be provided for, is not the maximum at left end = 5.92 tons, but is the larger shear found on either side and adjacent to the maximum intercept and bending moment. This is found to be here = 2.42 tons. The greater shear at ends of girder is more than sufficiently provided for by the extra depth of girder, above that required to resist bending moment at those points.

This girder is represented in Figures 91 and 92.

Example 4. Loading as in Case 3, Figure 3.

Flitch-plate girder, composed of two white-pine timbers, each 6 inches thick, and a wrought-iron plate 1 inch thick, between them.

Required, the depth of the timbers and plate.

The formulæ for flitch-plate girders may be found in the *American Architect*, Vol. 9, p. 93.

The formulæ there given for Case 3 are here applicable, and are as follows:

1. BREAKING.

$$M = \frac{d^2}{4 f}\ (B\ b + B'\ t). \qquad (24.)$$

2. BENDING.

$$M = \frac{r\ d^3}{1728\ L}\ (E\ b + E'\ t) \text{ Concentrated load.} \qquad (25)$$

$$M = \frac{r\ d^3}{2160\ L}\ (E\ b + E'\ t). \text{ Uniform load.} \qquad (26.)$$

Let b = total horizontal breadth of the two timbers, in inches.

Let d = depth of timbers and plate, in inches.

Let E' = coefficient for bending for wrought-iron.

Let B' = coefficient for breaking for wrought-iron.

Let $f = 5$; $r = .03$.

Let t = thickness of wrought-iron plate, in inches.

For white-pine: $S = 1.24$; $E = 858$; $B = .219$.

For average wrought-iron; $S = 22.5$; $E' = 12443$; $B' = 1.199$.

Length L of the girder to be 28 feet.

Substituting these values in formulæ 24 and 26, and reducing, we obtain the following:

$d = 15.82$ for breaking.

$d = 16.20$ for bending, uniform load.

The shear adjacent = 2.42 tons. One inch depth of girder will safely resist 7.48 tons shear. Therefore, 7.48 : 2.42 : : 1 : .32 inches = additional depth of girder required to resist shear.

Then $16.20 + .32 = 16.52$ inches. The girder can either be made 17 inches in depth, or 16 inches deep and the thickness of the timbers increased to 7 inches each, which would be cheaper.

This girder is represented in Figures 93 and 94.

Example 5. Loading as in last case.

Flitch girder composed of two white-pine timbers and a wrought-iron I-beam, bolted together, as in Figure 17.

Since only certain stock sizes of I-beams can be readily obtained, it will be best to assume the section of I-beam and depth of timbers, then determine their thickness.

Let I = the moment of inertia of the I-beam, and whose numerical value can be readily obtained from the pocket-books.

Evidently, for a wrought I-beam and plate of equal stiffness,

$$I = \frac{t\ d^3}{12}.$$

Substituting I for its value in formulæ 24, 25 and 26, for flitch-plate girders, we obtain the following formulæ, which are applicable to this form of flitch girder.

1. BREAKING.

$$M = \frac{B\ b\ d^2}{4 f} + 3\ \frac{B'}{d f}\ I. \qquad (27.)$$

2. BENDING.

$$M = \frac{E\ b\ r\ d^2}{1728\ L} + \frac{E'\ r}{144\ L}\ I. \text{ Concentrated load.} \qquad (28.)$$

$$M = \frac{E\ b\ r\ d^2}{2160\ L} + \frac{E'\ r}{180\ L}\ I. \text{ Uniform load.} \qquad (29.)$$

Assuming a Carnegie Bros'. 15-inch 50-lb. beam, we find the corresponding value of $I = 530$.

For white-pine; $S = 1.24$; $E = 858.$; $B = .219$.

Let $f = 5$; $r = .03$; $L = 28$. Required b.

Substituting the values in formulæ 27 and 29, we obtain:

$b = 9.13$ inches for breaking.

$b = 6.03$ inches for bending, uniform load.

As the shear = 2.42 tons, this would require .38 inch additional breadth of the timbers.

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Hence, 9.13 + .38 = 9.51 = total breadth of the two timbers.

Two timbers would be used, each being 5 inches thick.

The girder is shown in Figures 95 and 96.

It is evident that this form of flitch girder would be more economical than the ordinary kind, since the timbers are smaller than in the last case, and the iron weighs 3½ lbs. per foot less.

It would be about $8.75 cheaper in this case.

Example 6. Loading the same as in the two last examples.

Girder to be composed of a white-pine timber 16 inches deep, with top and bottom plates of wrought-iron ½ inch thick, firmly fastened to it.

Required the breadth b of the timber and plates.

Let t = thickness of each plate; d = depth of timbers; other notation as before.

Then, by formula 15, for top and bottom plates alone,

$$I = b\left[\frac{(d+2t)^3 - d^3}{12}\right].$$

Substituting this value in place of I in the general formulæ 27, 28 and 29, we obtain the following general formulæ, applicable to this kind of girder, with top and bottom plates of wrought-iron.

1. Breaking.

$$M = \frac{b}{4\,t}\left[B\,d^2 + B'\frac{(d+2t)^3 - d^3}{d}\right] \qquad (30.)$$

2. Bending.

$$M = \frac{b\,r}{1728\,L}\left[E\,d^3 + E'\left((d+2t)^3 - d^3\right)\right] \qquad (31.)$$

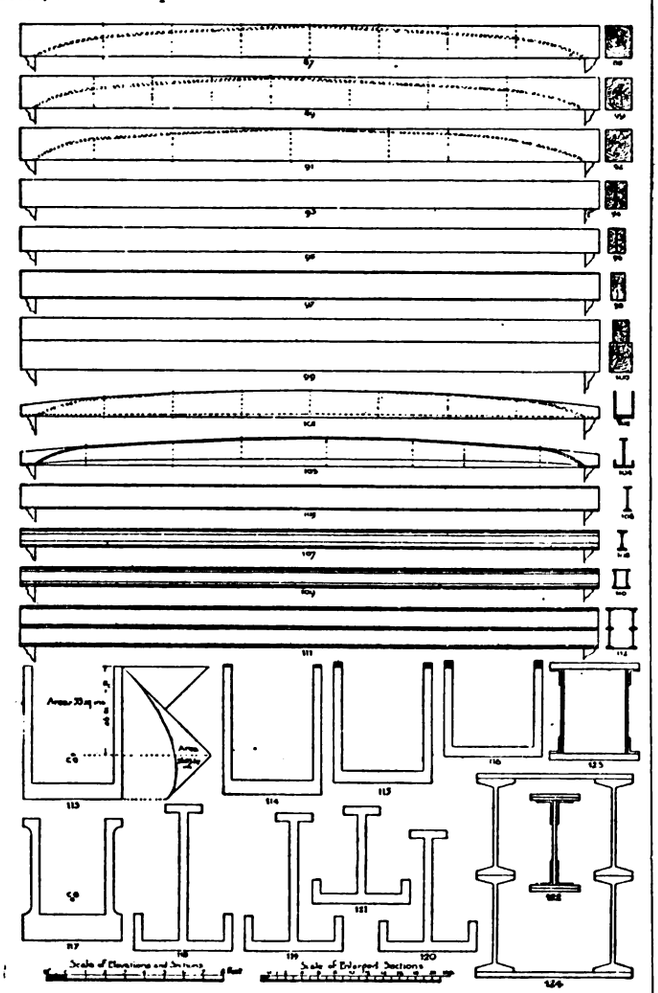
Concentrated load.

$$M = \frac{b\,r}{2160\,L}\left[E\,d^3 + E'\left((d+2t)^3 - d^3\right)\right] \qquad (32.)$$

Uniform load.

Substituting the numerical values in these general formulæ, we find $b = 8.43$ inches for breaking, which is larger than either value for bending. For shearing, the additional breadth = .35 inch.

The girder may be composed of a timber 9″ x 16″, and two plates .5″ x 9″. This girder would be about $26 cheaper than the ordinary form, as in example 4.



Example 7. Loading as in Case 3, Figure 3.

Girder to be double, being composed of two yellow-pine timbers, bolted and keyed together, one above the other.

It may be safely assumed that any reduction of strength caused by gaining-in floor-joists, is fully compensated by this bolting and keying the girders together.

In this case M = 47.92 foot-tons.

Let $f = 5$; $r = .03$; $d' = .5\,d$, since section is rectangular.

For yellow-pine; $S = 2.17$; $E = 925$; $B = .250$.

The depth of the upper timber will be the same as of the joists: its width can be assumed, and the width of the lower timber should be 2 to 4 inches greater; the depth of the lower timber may then be found by calculation.

Suppose the upper timber to be 10″ wide x 14″ deep; lower timber 14 inches wide: required, its least safe depth.

Substituting the proper values for upper timber in formulæ 4 and 8, we find:

M = 24.49 foot-tons, for breaking.

M = 12.43 foot-tons, for bending, uniform load.

Hence, 12.43 foot-tons is the maximum bending moment that can be safely resisted by the upper timber alone, and 47.92 — 12.43 = 35.49 foot-tons = bending moment to be resisted by the lower timber.

Substituting this value of M in formulæ 4 and 8, assuming the breadth = 14, and substituting the results in formula 10, we have:

d = 14.24 inches, for breaking.

d = 17.68 inches, for bending, uniform load.

The additional depth for shearing = .40 inch.

Hence, 17.68 + .40 = 18.08 inches.

The girder may be composed of an upper timber 10″ x 14″, and a lower one 14″ x 18″. This girder would be considerably cheaper than any form of flitch girder.

If the girder be properly bolted and keyed, its actual strength will be considerably in excess of that required, but as its exact strength is not easily calculated, it will be found safest to solve the problem in the manner indicated here.

Example 8. Loading as in case 4, Figure 4.

Cast-iron box lintel to be used.

The load = 11.2 tons and is uniformly distributed. Maximum value of M = 39.2 foot-tons.

1. Suppose the Reuleaux section, as in Figure 86, to be used.

Its dimensions may be directly found by formula 20.

Let $f = 5$; $r = .03$; $L = 28$.

For average cast-iron; $S = 11.00$; $E = 7835$; $B = 1.037$.

Substituting these values in formulæ 4 and 8, obtaining the values of I, and substituting these in formula 20, we find:

b = .994 inch for breaking.

b = .900 inch for bending.

Hence the unit of proportion b should be made 1 inch, and the central section of the required girder would then be as in Figure 117.

In practice, it is usual to make the webs of cast-iron girders about half as high at their ends as at the centre, drawing a circular arc through the three points thus found, which forms the top of the girder. The thickness of metal is usually the same throughout, though that of the lower flange might be lessened towards the ends with economy, and still retain sufficient strength. As only the central section would have Reuleaux's standard proportions, the other sections could not be determined by his formula but might be by the indirect method.

2. Suppose a box lintel of ordinary form to be used. Fig. 20. Notation same as in last case.

Applying formulæ 4 and 8, we find;

$I = 126\,d'$, for breaking.

I = 840.5, for bending, uniform load.

The webs are here assumed to be 1 inch thick, bottom flange 2 inches at centre and diminishing to 1 inch at ends.

We first assume a section 16.5 inches in height. Fig. 113. Applying the graphical method, as indicated in the figure, we find:

Area of inertia figure = 26.83; of section = 53. Hence, I = 26.83 × 53. = 1422.

According to the figure, d' = 11.00″. Hence I, for breaking, = $126\,d' = 126 \times 11 = 1386$.

As the value of I for the assumed section is slightly larger than this, the section will be sufficient, especially as no allowance for shearing will need to be added to this section.

In the same way, we can determine the sections required at points 3.5 feet apart, exclusive of area for shearing, as follows:

At 3.5 and 24.5 feet from left end, section 11 inches high. Fig. 116.

At 7 and 21 feet from left end, section 14.25 inches high. Fig. 115.

At 10.5 and 17.5 feet from left end, section 15.75 inches high. Fig. 114.

Area for shearing is added as indicated by the shaded areas in Figures 114, 115 and 116.

The girder is shown in Figures 101 and 102.

If the end heights are made half the centre height, and a circular arc drawn through the three points as in the figure, it is evident that only the central section need be calculated.

Example 9. Modified Hodgkinson girder. Loading as in Case 5.

Maximum value of M = 41.36 foot-tons. Other notation as in last example.

Applying the same general formulæ as in the last case, the following results are obtained:

The largest section would be required at 14.86 feet from left end, and would be as in Figure 118. Height 18 inches; upper flange 1″ x 4.5″; lower flange 12 inches wide and 1.25 inches thick; edge webs 4.5″ high x 1″ thick.

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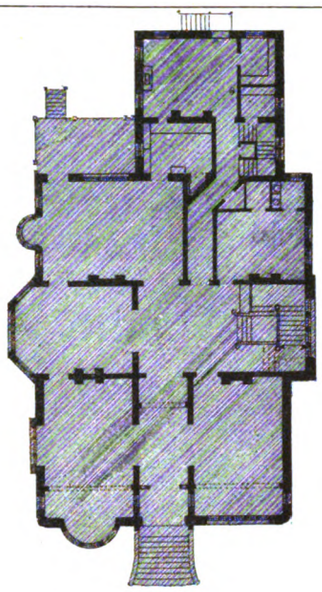

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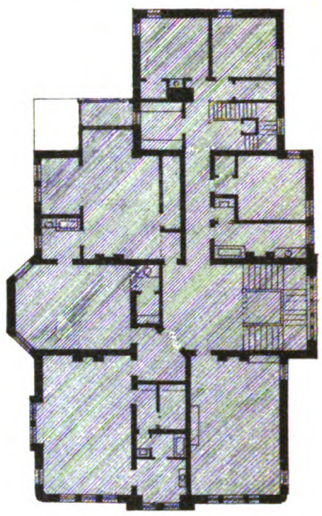

FIRST FLOOR

SECOND FLOOR

Reference Building to 30 Tremont St. Boston.

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Heliotype Printing Co.

Two Houses Newbury Street

Wining Lewis Architect

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PLATE XVII. CONVERGING LINES.

Fig. 77.

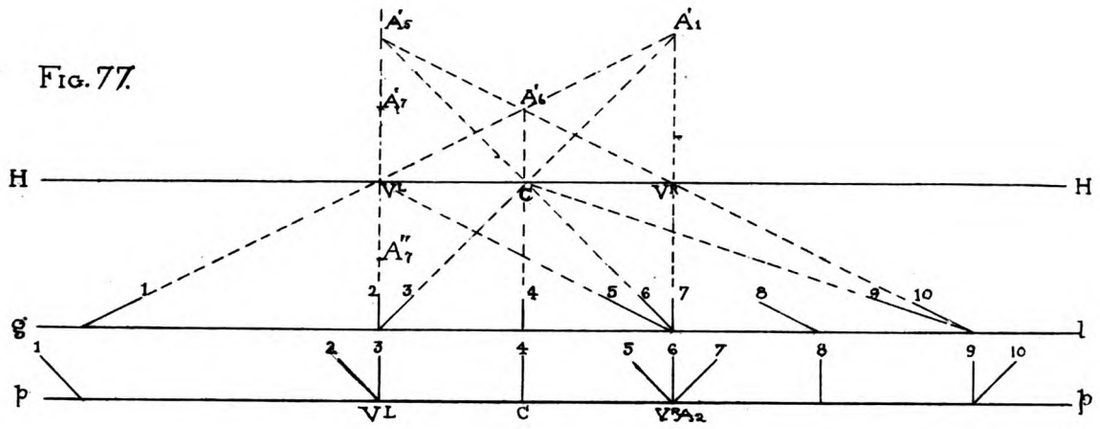

Fig. 80.

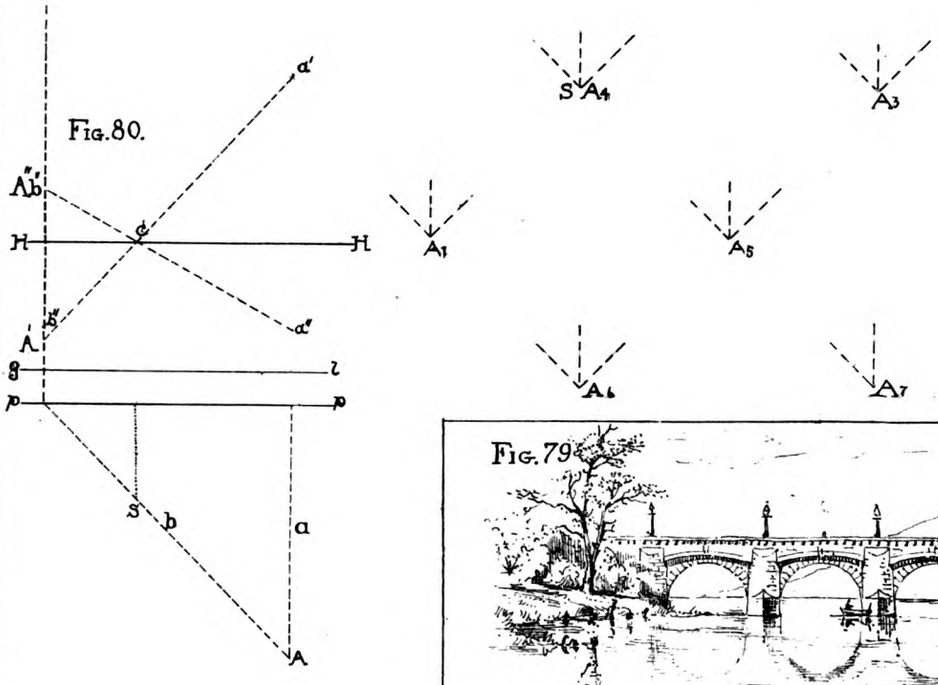

Fig. 79.

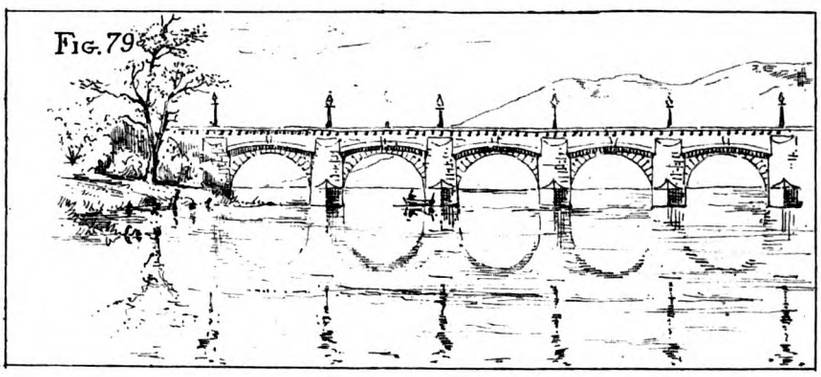

Fig 78.

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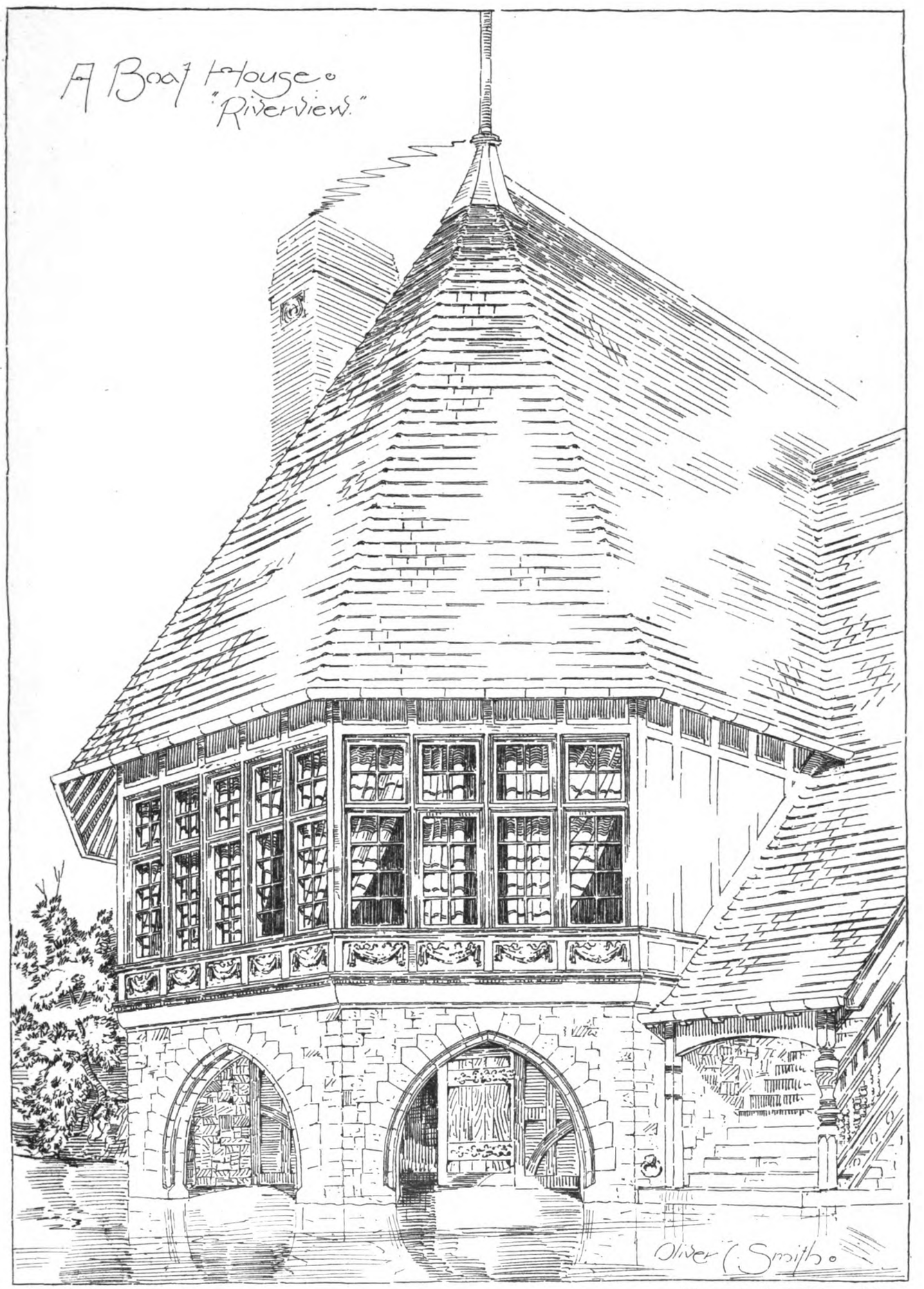

Heliotype Printing Co. 211 Tremont St. Boston.

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Sections at 10.5 and 19.23 feet are 17 inches high. Fig. 119.
Sections at 7.0 and 21.87 feet are 15 inches high. Fig. 120.
Sections at 2.56 and 25.7 feet are 12 inches high. Fig. 121.

The additional area for shear is best added to the height of the three webs.

In order to determine exactly the points at which a given section may be suitable, in this case, we must apply a reverse process.

Assuming the section, find its value of I and d'; substitute these in the general formulæ for breaking and bending (4, 7, and 8), and determine the values of M corresponding, selecting from these the *safest* value.

Divide this value of M by the pole distance, and obtain the corresponding length of the intercept. If this value of the intercept be then laid off downwards from the closing line, on any vertical, and a line drawn through its lower end parallel to the closing line, this will cut the equilibrium polygon or curve, immediately under the two required points. Draw verticals through the intersections and measure their distances from the end of the girder, which will be the required distances.

The height of web may also be found approximately by drawing a circular arc, as already explained.

Example 10. Wrought-iron I-girder. Fig. 27.

Loading as in Case 6, Figure 6. Maximum value of $M = 32.96$ foot-tons.

For average wrought-iron; $S = 22.5$; $E = 12443$; $B = 1.199$.

Other notations as before.

Applying formulæ 4 and 8:

$I = 45.82\ d'$, for breaking.

$I = 445.3$, for bending, uniform load.

If a 15-inch Carnegie Bros.' beam be used, $d' = 7.5$ inches.

Then for breaking, $I = 45.82 \times 7.5 = 343.7$, against 445.3 required to resist bending.

Hence a 15-inch 50-lb. beam should be used, for which $I = 530$. This would be considerably cheaper than to use two beams of less depth, as two 12-inch 42-lb. beams might be used, but which would weigh 84 lbs., against 50 lbs. for the 15-inch beams. This girder is shown in Figures 105 and 106.

Example 11. Wrought-iron built I-girder. Fig. 32.

Loading as in Case 7, Figure 7. $M = 30$ foot-tons.

Applying the general formulæ, we find:

$I = 41.71\ d'$, for breaking.

$I = 405.19$, for bending, uniform load.

Maximum bending moment occurs at 13 feet from left end, and the corresponding section is found to be as in Figure 122.

The girder is shown in Figures 107 and 108.

The top and bottom are composed of two plates $\frac{3}{8}''$ x 6,'; web is $\frac{3}{8}$ inch thick; girder 12 inches deep, with 4 angle-irons 2″ x 3″ x $\frac{1}{4}''$. Between the left end and 4.85 feet from it, also from 22.2 feet to the right end, the extreme top and bottom plates of flanges can be omitted, not being required, though this is not usually done.

Example 12. Wrought-iron box girder. Fig. 33.

Loading as in Case 8, Fig. 8. $M = 47.68$ foot-tons.

Applying general formulæ:

$I = 66.29\ d'$ for breaking.

$I = 646.9$, for bending, uniform load.

The girder is found to be as shown in Figures 109 and 110, the enlarged section being Figure 123. It is composed of top and bottom plates, $\frac{3}{4}''$ x 11″, is 12 inches high; webs are $\frac{1}{4}''$ thick, and has four angle-irons $1\frac{5}{8}''$ x 2 x $\frac{1}{4}''$.

Example 13. Wrought-iron U. S. girder. Fig. 31.

The girder to be 28 feet long in clear, and to safely support a uniformly-distributed load of fifty tons.

$M = \frac{1}{8}\ W\ L = .125 \times 50 \times 28 = 175$ foot-tons.

Shear at ends = 25 tons, uniformly diminishing to zero at the centre.

Applying formulæ 4 and 8:

$I = 486.5\ d'$, for breaking.

$I = 2363$, for bending, uniform load.

The section may be found by the indirect and graphical method, being assumed, drawn, and the corresponding values of I and d' determined, in the manner already employed for the same form of section in Figure 73.

Or it may be found by calculation as follows.

Assuming that four Carnegie Bros.' 12-inch 42-lb. I-beams are to be used with top and bottom plates $\frac{5}{8}$ inch thick, the width of the plates may then be found.

The tabular value of I for this I-beam = 275, taken about a horizontal axis passing through its centre of gravity. But in this case its moment is required about the centre of gravity of the entire section, which is 6 inches from the former.

Hence, by formula 21, the true value of $I = 27_D + (12.5 \times 36) = 725$. (Area of section being = 12.5 square inches.)

For the four I-beams, $I = 725 \times 4 = 2900$.

The total depth of section = 25.25 inches; $d' = 12.675$ inches.

Hence, I for breaking = $486.5 \times 12.675 = 6166$. (Maximum.)

The required value of I for plates only = 6166 − 2900 = 3266.

By formula 15, for plates only, substituting value of I and reducing for b, we find $b = 17.23$ inches.

The plates would therefore require to be 17.2_D inches wide, or 19 inches, if allowance be made for rivet-holes, as should be done.

This girder is shown in Figures 111 and 112; an enlarged section is given in Figure 124.

N. CLIFFORD RICKER.

THE ILLUSTRATIONS.

HOUSE FOR S. A. KENT, ESQ., CHICAGO, ILL. MESSRS. BURNHAM & ROOT, ARCHITECTS, CHICAGO, ILL.

THE fronts are entirely of plain and moulded Philadelphia bricks, the carved panels, string-courses, etc., being red terra-cotta, made of the same clay as the bricks. The roof is of dark red slate.

TWO HOUSES ON NEWBURY ST., BOSTON, MASS. MR. W. W. LEWIS, ARCHITECT, BOSTON, MASS.

Each house is of brick and brownstone, 16 feet wide, finished in pine and white-wood, stained or painted. Hard-wood floors, first story; soft wood, stained, elsewhere.

DESIGN FOR A BOAT-HOUSE. MR. O. C. SMITH, ARCHITECT, PITTSBURGH, PA.

PERSPECTIVE PLATE XVII. CONVERGENT AND DIVERGENT LINES.

AMERICAN ARCHITECT COMPETITIONS.

THE jury of award have accorded the five equal prizes in the competition for designs for cast and wrought iron-work to the authors of the following designs: —

"*Cross Keys.*" Mr. J. W. H. Watts, Ottawa, Can.
"*Art Lover.*" Mr. J. W. Northrop, Hartford, Conn.
"*Two A. M.*" Mr. B. M. Lincoln, Hartford, Conn.
"*Ferrum.*" Mr. W. C. Hazlitt, New York, N. Y.
"*Vulcano.*" Mr. C. H. Rau, Rochester, N. Y.

We find it most convenient to delay the publication of these drawings until December 2.

THE subject of the next competition is one which is of the widest possible interest — a cheap dwelling; and we trust that more than the usual number of designs will be submitted in competition.

PROGRAMME.

The house is intended for a clerk, who has a salary of only $1,500, but whose social position is unexceptionable, and he consequently hopes to be able to build for the $3,000, which economy has placed at his command, a house in harmony with the tastes and habits formed during bachelorhood. He is now married, and has two children who must be provided for in the planning, as also the maid-of-all-work.

The material of the building, size, number, and distribution of the rooms are left to the competitors to determine, who are to be guided solely by the cost, which must approximate $3,000.

Required: — Plans of each floor, a perspective sketch, and an elevation of one of the sides not shown in the sketch, also all necessary details to a larger scale, and at least one sketch of some feature of interior arrangement.

Also, a skeleton specification of the briefest possible dimensions, enough merely to give a clue to the character and quality of the work. Also a bill of quantities giving the actual number of yards of excavation, perch of stone-work, MM of brick, laths and shingles, feet of lumber, window-sashes, doors, nails, hardware fittings, special fixtures, labor, etc., giving the present market price for the locality on each item, and reckoning-in the proper amounts for waste and allowances of all kinds, including the builder's profit, and the architect's commission. Those who can secure actual estimates from reliable builders are urged to do so.

The specification and bill of quantities are to be submitted on paper of the size of legal cap, and the drawings upon two sheets, each measuring 14″ x 22″ within the framing line.

All drawings must be received at the office of the "*American Architect*" on or before Saturday, January 13, 1883.

For each of the three designs of highest merit a prize of seventy-five dollars will be paid.

ON THE PREVENTION OF FIRES IN THEATRES. — II.[1]

IT is too much to ask a man to stand and fight fire when he knows that there is a tinder-box between himself and safety, and that at any moment a drifting spark may cut off his only chance of escape. Sometimes such heroes do exist, who pay for their bravery with their lives, but these are only warning examples to others not to risk their own in similar efforts.

[1] Concluding extracts from a paper read by C. John Hexamer, at the Stated Meeting of the Franklin Institute, held June 21, 1882, and published in the *Journal of the Franklin Institute*. See *American Architect* for August 12, 1882.

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In this case we must again take our resort to automatic means, and for this purpose automatic sprinklers, which have been in use in mills for some time, would be of great value.

As a plentiful supply of water is not always at hand, and as steam-pumps frequently get out of order, large reservoirs should be placed on top of theatres. These should be placed on top of the auditorium and not in the rigging-loft. The stage, as the most inflammable part, being generally ignited first, would (if the reservoirs were placed on it) deprive the remainder of the building of water.

In order to keep the water in these tanks from freezing, the exhaust-steam pipe of the engine should be made to pass through it, or, as this is not always convenient, it should be mixed with salt (salt water having a lower freezing-point than pure water). The addition of salt would also have the wholesome effect of preventing the formation of algæ (the green slime found on ponds and other still water), which are obnoxious by their smell and by the tendency they have of closing the pipes.

Every theatre should have a fire-brigade consisting of at least five men; these should be present at all performances, and should be perfectly familiar with the theatre and all its fire appliances.

At Carlsruhe (the seat of the famous polytechnic school) the authorities, after the great fire of the "Hof-theater," organized a fire-patrol of students. These are stationed all over the theatre, know all appliances, and, as a corps of gentlemen, must be much superior to ignorant men, both in case of fire and in quieting a panic.

Watchmen should be constantly on the premises, and, to control them, watch-clocks should be fixed in different parts of the building.

Automatic fire-alarms, placed in various parts of the stage, would be of great use, as the fire-department is generally notified too late.

We now arrive at the most important question: *the safety of audiences.*

From the numerous accounts of theatre fires which the author has collected he finds that loss of life is caused by (1) suffocation by smoke; and (2) the crushing and trampling of the panic-stricken masses.

Experience shows that death is mostly caused by suffocation, and that the burning of bodies is a subsequent occurrence, taking place after life has already become extinct. This was again clearly illustrated by the late Vienna fire.

We must, therefore, get rid of the smoke in the quickest and best manner possible. This question has been solved by the ingenious device of Hofman, which acts in conjunction with his automatic drop-curtain, and by Mr. Louis Sues of Chicago.

The intense smoke in the auditorium, during a fire on the stage, is caused by a draught of hot air from all parts of the house towards the open doors and ventilator. The latter is usually situated above the main chandelier in the centre of the auditorium ceiling. This draught may frequently be noticed by the sail-like outward bulging of curtains. We must therefore form a counter draught, which in case of fire would be strong enough to overcome the combined action of the doors and ventilator. This could best be accomplished by a chimney or flue on the top of the stage which would take off all smoke and cinders. Or, as before stated, *making a perfect shaving-vault of the stage.*

We will now describe the different solutions advanced for this problem, beginning with the simplest.

A good idea was suggested a short time ago by one of the inspecting chiefs of the New York Fire-Department. It was, to make the roof over the stage a vast skylight, the glass of which could be broken in case of fire, and a draught thus created which would carry the flames upward and prevent them spreading to the auditorium.

Next in order comes Mr. Sues' smoke-flue, the description of which I quote from his patent specification.

"The object of my inventions is to construct theatres so that this difficulty will be obviated to a great extent, and it consists in a large outlet in the roof over the stage for the passage of smoke in case of fire, so that a current of air will be induced from the auditorium to the stage, instead of from the stage to the auditorium, and combining with such outlet a ceiling over the stage portion of the building which will for a considerable time resist the action of fire, thus giving the audience time to escape.

"In the drawings, *A* indicates the auditorium; *B* that portion of the building devoted to the stage; *C*, the stage; *D*, opening between the stage and the auditorium; *E* is the ceiling over the stage. This ceiling I make practically fire-proof, either by making it wholly of metal, or by the use of metal joists with wire or wire-cloth for lathing, and usual plastering, or in other suitable manner. *F* is a large passage to be made of fire-proof material. It passes through the roof *G*. Its lower end is properly secured in the ceiling and is open, except when closed by the valve *a*. *b* is a chain by means of which the valve *a* can be opened. *c* is a weight which holds the valve in position when closed. The operation is as follows: if a fire breaks out upon the stage, the valve *a* is to be immediately opened. The ascending heat and smoke will rise to the ceiling, and escape through *F*, thereby producing a current from the auditorium to the stage, instead of the reverse, thus keeping the smoke and flames from the audience-room while the audience is escaping. In cases where a fire-proof drop-curtain is used, suitable openings may be somewhere provided to admit air to the stage. In theatres of the usual size the passage *F* should be about six feet in diameter. It may be carried some distance above the roof, which will increase the draught. Two or more of these passages *F* may be used. The opening at the top of the passage *F* may be protected from storms by caps."

This is an excellent device, the only objection to it is that it is not automatic; its usefulness in case of fire being, therefore, dependent on the coolness of the men having it in charge.

The ingenious device of Hofman combines an automatic wire drop-curtain, automatic smoke-flue, and an automatic fire-alarm. This device will act without the aid of a single hand, being entirely automatic.

It consists of a safety-rope, which runs on pulleys over the principal and most dangerous parts of the stage. This rope is prepared so as to be the most combustible substance on the stage. In case of fire, it will, therefore, ignite and burn off almost instantly. Has this moment arrived, a heavy weight, held by the safety-rope, falls. This weight being connected with the machinery of the curtain by a lever, the lever is raised, the machinery set in motion, and the curtain lowered. Not, however, with a sudden fall which might damage it, but steadily.

The falling of the heavy weight at the same time opens the valve of the large smoke-flue contained in the roof of the stage, whereby the smoke and heat of the fire is kept on the stage and taken out through the flue; thus giving the audience time to leave the theatre quietly and in order, without being threatened by smoke or heat. The same moment the above takes place, the fall of the weight sets a fire-alarm in motion and the fire-department is notified.

We have now seen the different devices for getting rid of that greatest danger to audiences — smoke — and can now compare their relative values. The first would be very simple, but in the time required for the firemen to arrive and break in the glass of the skylight, the audience might be suffocated.

The second is an excellent patent, its only objection being as before stated, its want of automatism.

The third, to the author, seems undoubtedly the best, for if in case of fire, the men having it in charge should neglect to open the valve, it would act automatically; not to speak of the immense value of the automatic wire drop-curtain and fire-alarm.

The writer has frequently noticed the time required by audiences to vacate theatres, and out of numerous experiments finds it takes from 3¼ to 11 minutes for a theatre to be entirely emptied. But this time is protracted indefinitely in case of a panic. It has been found that in cases where audiences had ample time to vacate theatres many were killed, although not prevented from escaping by the smoke.

This is explained by the jamming of crowds in corridors. A mass of people may best be compared with a number of logs floating down a stream, which at some point, by their mutual pressure, form arches across it, thus becoming wedged fast. In the same manner persons form arches across corridors which are sometimes broken only to be formed again. This, the cause of many deaths, may be remedied by making the walls of corridors inclined towards each other, being narrowest in the theatre and widening towards the exit-doors, as it is impossible for logs to jam in a widening water-course.

There should be outlets from each gallery or floor separate and distinct from every other outlet, so that a crowd from one gallery cannot precipitate itself upon a crowd from another floor that is struggling to get out.

A matter still sometimes neglected is, that all doors should open outwards. The people of the fourth gallery at the recent Vienna fire, for example, were hindered from flight by the doors opening inwards.

Most theatres have a sufficient number of exits, but in order to save door-keepers most of them are locked; some not being satisfied with locking them, even nail and bolt them shut.

Corridors are also frequently too narrow; these should never be less than eight feet broad, which would allow at most but five persons abreast.

Another outrage to humanity are high galleries. In American theatres there are never more than three, but in Europe they have as many as five. Law should forbid the erection of more than two galleries, *i. e.*, a "balcony" and "family circle."

The horrors of theatre fires are always increased by the total darkness which envelopes audiences a short time after commencement of the fire. This is frequently caused by the explosion of gas on the stage. To obviate this, all theatres should separate the system of lighting the auditorium from that of lighting the stage. After years of hard work, the authorities of Vienna succeeded in compelling managers to have oil-lamps in corridors. The order was complied with, but as was seen by the late catastrophe, these were never lighted. It has frequently been urged, especially by "insurance men," that the risk from fire would only be increased by the use of coal-oil in these lamps. But it is not necessarily said that petroleum must be used, for any of the heavy oils (used long before coal-oil was known) might be employed with advantage. If these should be objected to, let it be remembered that festivals which outrival everything in history by their splendor, and that the plays of a Corneille and a Moliere were first produced before the eyes of the then most powerful king of Europe, by the light of *candles*. Why should these then not satisfy us in the humble position of safety corridor-lights?

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Particular attention should be paid to the calamity at Carlsruhe in 1847. By the inattention of one of the servants in lighting the gas the drapings of the Grand-Ducal box caught fire. All parts of the house were crowded, over 2000 persons being present. The flames instantly spread to the balcony; every one tried to escape in the greatest hurry. The audience of the parquet, as well as that of the balcony, saved themselves, but the greatest confusion ensued in the higher galleries, which were in a short time filled with smoke. Of the four exits, but the one under which the fire broke out was open. Every one rushed to this exit and very soon it was jammed shut. The scenes following were indescribable: a few climbed or jumped from the galleries; others threw themselves out of the windows; many were crushed to death, and most were suffocated by the hot smoke. In the narrow corridors people were lying in heaps. To this was added that immediately after the breaking out of the fire the gas was turned off from the street, and the building thrown into total darkness. The situation of the people, jammed fast in corridors, without light, enveloped in smoke, was frightful. This catastrophe cost the lives of sixty-three persons, and over two hundred were terribly wounded. As before mentioned, the theatre had four exits, but to save the expense of extra door-keepers three of these had been closed for years, and not only locked but nailed and boarded shut, and but few knew the existence of these extra exits.

One cause saved the lives of many — gas had not long ago been introduced and on this account many oil-lamps had been retained to do duty in corridors. These lamps, which had been the objects of wit and sarcasm, saved the lives of hundreds.

We had at Vienna the counterpart of Carlsruhe, only in this case the lamps were not lighted or hundreds of unfortunate victims would have been saved.

It can, from this, be seen how necessary oil-lamps are, and that in the deciding moment this precaution will save many lives.

Before concluding my remarks it may be well for me to give an example of a theatre which was managed in the correct manner, which had many of the modern improvements, and which at the same time is the first case on record in which *the entire* audience of a burning theatre escaped in safety. On the 16th of April, of this year, during a performance of the farce "Robert and Bertram," at the "Hof-theater," of Schwerin, the cry of fire was suddenly heard from one of the galleries. As no flames or smoke were perceived the audience remained seated, until the news came from the outside that the roof was burning. The Grand Duke, who was present, immediately addressed a few words to the audience and ordered the musicians to continue. The stage-manager also assured the audience that there was no danger. But soon the wire curtain had to be lowered, and now the audience left the theatre in the greatest order, especially the densely-packed galleries were rapidly cleared, the audience escaping through the numerous exits, *which were all open.* For some time previous to the occurrence audiences had been instructed — by means of large placards hung in the corridors — how to act in case of fire. The *oil-lamps were all lighted*, and the wire curtain was in *good working order*, thus for the first time practically illustrating its use. On account of these excellent arrangements it was possible for the whole audience to save itself, although many ladies and children were present. Here we then have an example to show how, with proper precautions, faithful employés — especially the man who let down the wire curtain — and cool, collected conduct, an audience may be spared the dangers of a theatre-fire. The beautiful theatre burned down, also the large Concert-Hall attached to it. But the only life lost in the event was that of a fireman who was buried under a falling wall, this occurring a considerable time after the audience had escaped.

The author hopes to have shown how theatres can be built, although not fire-proof, yet in a manner so as to give safety to audiences.

Theatres *could* and *should* be built so that the largest audiences could escape in safety.

THE VALUE OF COAL-TAR. — Before the year 1856, the value of coal-tar in London was hardly one cent per gallon, and in most of the English country towns gas-makers were glad to give it away. Up to that time but small quantities of benzine, naphtha and creosote oils had been distilled. In 1856 the discovery of the mauve or aniline purple gave a great impetus to the coal-tar trade. At the present time the color-trade industry practically uses all the benzine and most of the naphtha, all the anthracine and a portion of the naphthaline, resulting from the distillation of coal-tar. It is estimated that the value of the coloring matter so produced is upward of $16,000,000 in England alone. Over 1,000,000 tons of ammoniacal liquor and 95,000 tons of sulphate of ammonia are made, which is worth over $100 per ton. It is said that the by-products of the English gas-works exceed the value of the coal used by $15,000,000. It is to this wonderful economy in the utilization of the waste products that the English cheap gas is due. A gas engineer from this country a few years ago spoke of English gas works as being works for the production of coal-tar, ammonia liquor, etc., which sold their gas as a by-product at little more than the cost of producing it. Anxious as the gas-makers are to increase the consumption in order to make more profitable portions of the business larger, it seems strange that they have not more generally taken measures for encouraging consumption. In many places the application of gas for heating purposes is difficult, in consequence of the reduced pressure on the mains during the day-time. In fact, this pressure is so low as to barely prevent the indraft of atmospheric air into the pipes. — *The Metal-Worker.*

AMERICAN WOOD-ENGRAVING.[1]

I HAVE brought with me to-night a number of specimens of these modern American wood-engravings. You are, perhaps, aware that its processes have been assailed with some asperity by representatives of the more conventional school. A fierce controversy has been going on between these artists and that veteran engraver, Mr. Linton, to whom they, in turn, doubtless owe much of their instruction. Mr. Linton has no faith in the new movement, he denounces the liberty which many of the younger men allow themselves, and he regrets the recent attempts that have been made to reproduce varied effects of tone and color, and to imitate the different modes of execution in pen, brush, or charcoal, as a waste of time and a wanton perversion of skill and labor. It would take too long to follow Mr. Linton in all the details of criticism, nor is it necessary for our purposes to do so; the point which he seems to miss is that wood-engraving in its modern acceptation is of a wider scope than he would seem disposed to allow. It is idle, at this time of day, to attempt to confine wood-engraving within the limits of an original art. A process which offers such facilities in regard to reproduction must, of necessity, be employed in a vast variety of ways, and there seems to us to be no reason in the nature of things why one school of workmen should not take the course which the American engravers have followed. An experiment of this sort must be measured by its success; nor can it be gainsaid that these younger engravers of America have in this respect more than justified their departure from the accepted rule. So closely does the work accord with the original it has undertaken to imitate, that I have often heard it asserted, even by artists, that these American wood-blocks are in fact not wood-blocks at all, but are mechanical reproductions of drawings or paintings. Of these mechanical reproductions I shall speak more at length in my next lecture, but although these American illustrations are genuine works of wood-engraving, there would seem to be little doubt but that the efforts of their authors have been largely stimulated by the success with which various mechanical processes have lately been developed.

That a wood-engraver, who has faith in his art as a dignified means of original expression, should regard with dislike the kind of dexterity which this younger school has acquired, is conceivable enough, but the truth is that these pretensions which Mr. Linton and others are now making, are of quite recent origin. In all its past history, wood-engraving has been a recognized method for reproducing original work. When the propriety of *fac-simile* engraving is once admitted — and *fac-simile* engraving, it may be remembered, is the very earliest and worthiest form of the art — the accusations brought against the younger school will be found to lose half their force.

Their practice is nothing more than a development of a principle that has been tacitly acknowledged since the craft has been in existence, and as the earlier workmen strove to reproduce faithfully the simple lines of the design, so they now endeavor, by greater variety of method, to copy exactly the effect and color of the original drawing. The degree of success which they have attained can only be judged by reference to particular examples; but their efforts would certainly have missed success if they had allowed themselves to be hampered by the rules which Mr. Linton, and those who think with him, now seek to impose upon the art. The principle that may be said to characterize all the work of the school springs out of a single desire to preserve the character and appearance of the work chosen for reproduction; and with this work steadily in view, the engraver permits himself to make use of devices which are often in conflict with the conventional kind of execution hitherto employed. That these devices are, in many cases, experimental, is frankly acknowledged; but no one who studies these blocks attentively can fail to perceive that such experiments have been the means of enriching the resources of the art. Now and then their endeavor to do justice to the original artist may result in a failure; but this failure is more than counterbalanced by many successes, and by the strong impress of personal and individual style which the experiment has gradually developed. The engraver, it will be seen, begins to acquire and to practice a system of his own, by which he is enabled to infuse into his work a new sense of variety, and to claim for it a kind of attention and interest such as could never be allotted to the strictest adherence to a rigid rule of procedure; and it may be said, further, that in the hands of the most gifted of these America engravers, a sense of style is gradually asserting its control over the newly acquired methods.

[1] Extract from a "Cantor" lecture, by Mr. J. Comyns Carr, published in the *Journal of the Society of Arts.*

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I may point, in particular, to the work of Mr. Cole, as it is shown in the pages of *Scribner's Monthly Magazine*. The block, for instance, in which he has reproduced the noble picture of "The Sower," is executed in a manner that has nothing discordant with the principle that Bewick established. Where the simple line can be used, as, for example, in the treatment of the sky, the artist has shown his willingness to adopt that mode of treatment; and although the whole effect of the block is delicate and refined, there is an admirable economy of method in the way in which the dark, sombre figure is relieved against the dark hill-side.

These essays of American engravers present, as I have said, nothing that is antagonistic in principle to the practice of Bewick. Their method is founded, like his, rather upon the rendering of mass than upon severe definition of line, and the differences between the two are differences of detail. And yet these differences, it must be allowed, are not unimportant. Though Bewick, in his admirable cuts of British birds, did not insist upon outline, he always adopted a regular and uniform system of execution. He worked with line even while he was endeavoring to secure effect of tint; and it will be seen that although he makes use of the black surface of the block where he can give the sense of dark color, yet the lighter tints are always produced by delicately-cut lines which have a rhythmical and regular direction. The majority of the American engravers do not confine themselves to this method. If they want to relieve or lighten a dark surface, they as often as not pick out the lights in small irregular holes. They stipple, so to speak, with the point of the graver, and their work has, for this reason, more of the appearance of accident and less of the method of art. And it must be said further that they are greatly assisted by the mechanical appliances of printing which were not within Bewick's reach. The printing of wood-blocks in America is itself an art, and much of the beauty of the wood-engravings depends upon its exercise.

ARCHITECTURAL SCHOOLS.

Streator, Ill., October 16.

To the Editors of the American Architect: —

Dear Sirs, —Will you kindly inform me through the columns of the *American Architect* what architectural school you consider the best in Europe. Also give me some information regarding the one at Paris, the cost of tuition, etc., with address of corresponding secretary of same, and oblige,

Yours very truly, F. S. Allen.

[The best architectural school in Europe, to our mind, is the Architectural Department of the Ecole des Beaux-Arts in Paris, in which tuition is free. Application for admission must be made through the United States Minister, to the French Minister of Fine Arts. There is no such officer as a corresponding secretary of the school. — Eds. American Architect.]

TO DEVELOP A NATIONAL STYLE.

Atlanta, Ga., November 6, 1882.

To the Editors of the American Architect: —

Dear Sirs, — In your notice of the convention at Cincinnati it appears you did not get the true inwardness of the motion for each one of us, Fellows and Associates, to make a design for the next convention. I made the motion, and the idea was this: in view of the fact that as America has no marked style of architecture of her own, as other countries have, it behooves the A. I. A. to put their shoulders to the wheel and make a systematic and united effort in that direction, and that the Trustees give out a problem, and each one of us solve it as he thinks best, avoiding at the same time the beaten tracks. By this method it is hoped a national style will be formed in time, especially if we have your valuable aid in agitating the matter from time to time, of which I feel perfectly sure.

Very respectfully yours, John Moser.

NOTES AND CLIPPINGS.

A Big Well — The largest well in California is now rapidly nearing completion in Wilmington, in this county. It is the enterprise of General Phineas Banning, one of the most energetic citizens of Los Angeles County, who has made this well his hobby and pride for several months past. It is twenty-five feet in diameter, and has reached a level some forty feet below the surface of the earth. In the interior of this circular hole a huge wooden tank, hooped together with iron bands, and each stave twelve inches square, has been built. The inside of this tank, which is bottomless, is hooped with bands of railroad iron, and formed so that the bottom flares outward and is wider than the top. As the earth is removed from the bottom of the well, this mammoth bottomless tub, one foot thick, sinks downward, thus forming a water-tight wall. On top of this wooden structure a brick wall is being built as the hole becomes deeper. The water enters the well at the bottom in large volumes, but it is kept almost dry by the operation of a large steam-pump, which runs night and day. There is room for twenty-five or thirty-men to work upon the bottom of this well. When it is completed the water will be pumped into a gigantic tank, which, being elevated above the ground upon scaffolding, will give sufficient gravity to send water in any direction for miles. With the completion of this well Wilmington and San Pedro will have an assured supply of water for all time. Pipes are laid to the wharf at San Pedro, so that vessels can take water with greater ease and without trouble. The cost of this monster well will not be less than $8,000 or $10,000. — *Los Angeles (Cal.) Telegram.*

The Tulpehocken Town-Clock. — The Tulpehocken town-clock is interesting to study as a piece of rather phenomenal machinery. One of its characteristics is its variety. It has four faces, a face upon each side of the tower, and persons who are not satisfied with its alleged record of time upon one face can obtain another and wholly different record by looking at another face. The four sets of hands never, excepting by accident, tell the same story. It will be quarter past two on the north dial when it is twenty minutes of nine on the south dial, and at the same moment the east and west dials will range from half-past six to five minutes of eleven. This would be perplexing to a stranger who wished to catch a train at the station, but the town folks are used to it. Generally they regard the clock simply as an original kind of curiosity, not depending upon it in any manner for accuracy; but it has been discovered that a reasonable approximation to the correct time may be obtained usually by adding together the records of the four dials and striking a general average. The clock has what may be called idiosyncrasies. On the south dial the minute-hand every now and then changes off with the hour-hand, and each performs for a time the functions of the other, with the effect to fill with complete bewilderment the mind of the oldest inhabitant who has made a practice of looking at that dial alone. The east dial works differently. Now and then the hands come to a complete stop, say at 8 minutes past 12. After a few moments of repose, apparently to gather strength for a forward movement, both hands will suddenly whiz around and will slow up and begin regularly again at quarter to four. One who looks at the east dial just before and immediately after the operation gains an impressive notion of the rapidity of the flight of time. Now and then the hands on the north dial become interlocked, and for a day or two they revolve together, so that the meaning of their record is not very distinct, and it is difficult to make a fair average of the four dials. The hands on the west dial went backward every day for three weeks last summer, adding much to the interest with which the clock is regarded, and suggesting entertaining reflections as to the possibility of a machine which might take up the spent moments and wind us gradually back into the eighteenth century. The clock has a striking apparatus, but like the rest of the machinery it is peculiar. It has rarely been known to strike the hour when any of the minute hands touched the 12 spot. Thus far no one has been able to detect any exact system in the striking, but some careful observers hold that when 12 is struck it is fair to presume that one or the other of the dials marks 10 minutes after 2. This, however, is not yet verified. Occasionally the clock will not strike at all for several days, and then it will suddenly start up and strike 237 with such rapidity that the strokes can hardly be counted. The proposition is that it gets in at one time or another the proper number of strikes for each year, so that nothing is really lost. It is held by some that it would be better to have the clock begin on the first of January and strike up ahead for the whole ensuing year, so as to get that much work out of the way; but the clock will never be prevailed on to do anything so systematic and regular as that. The name of the maker is not known. It is thought he is dead, and there are those who urge that he overstrained and killed himself inventing and putting together such an extraordinary piece of mechanism. I often feel when I hear this clock strike 34 at a quarter to seven that I should like to have known that man; I should like to have a competent phrenologist examine his cranial development. — *Max Adeler in the Century.*

Value of the Public Buildings in Washington. — From the figures of the official assessment it appears that the Capitol building is assessed at $15,699,556, and the grounds at $7,907,595; the White House at $753,590, and the Executive stables at $28,500; the Treasury Department building and grounds at $7,008,454; the State, War and Navy Department building, $6,211,161; the Agricultural Department building, $331,825, and the grounds, $689,086; the Smithsonian, $492,651, and National Museum, $250,000, and the grounds, $2,553,378; the National Monument grounds, $1,815,781, and the Washington Monument, $300,000; the National Observatory grounds, $125,861, and the building, $255,284; the Patent-Office building and grounds, $3,754,883; the Arsenal buildings, $233,324, and grounds, $1,221,607; the Marine Barracks ground, $31,235, and buildings, $329,637; the Naval Hospital, $7,198,128; Bureau of Engraving and Printing, grounds, $27,612, building, $327,537; Winders building, used by Engineers' Bureau of the Army, $214,367; United States Medical Museum, $96,280; General Post-Office, ground, $312,495, building, $2,124,500; Government Printing Office, $236,000; Judiciary Square and City Hall, $1,399,713; United States Jail, $525,550; United States Navy-Yard, ground, $1,413,500, buildings and wharves, $3,615,808; Botanical Gardens, grounds, $1,462,251, buildings, $556,676, hothouses, $58,598 The aqueduct is valued at $3,847,547, and water-pipes and plugs, $172,276. The intersections of streets, circles and spaces are put down at $4,682,942; the Department of Justice, ground, $150,000, and building, $150,000; the Government Insane Asylum, $1,349,775; the Reform School, $221,056; the Soldiers' Home, grounds $333,947, buildings, $350,000; Naval Magazine, $95,000; the Georgetown Post-Office and Custom-House, $63,767.

Proposed Tunnel Under the Elbe. — Under the river Elbe, at Hamburg, it has been proposed to build a tunnel to connect that city with an island a third of a mile distant. The great Hanseatic city, which has hitherto been a free port, is shortly to lose that privilege, and to be included in the Zollverein or German Customs-Union. It is intended however, to make an exception in favor of the island in question, which bears the name of Steinwarder, and to permit it to retain the privileges of the free port. Large bonded warehouses will be built there for the accommodation of merchandise before paying duty, and in order to bring the island into closer connection with the city, the above-mentioned scheme for a tunnel under the river has been started. The tunnel would be 500 metres or nearly a third of a mile in length. This will be upwards of 300 feet longer than the Thames Tunnel. The cost of the Elbe Tunnel is estimated at about £900,000. — *Van Nostrand's Magazine.*

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

266,963. OPERATING TANK-VALVES. — James E. Boyle, Brooklyn, N. Y.

266,979. RADIATOR.—Thomas Davis, St. Paul, Minn.

266,989. AUTOMATIC FIRE-EXTINGUISHER.—Frederick Grinnell, Providence, R. I.

266,998. FIRE-ESCAPE.—John R. Judd, New York, N. Y.

267,019. FIRE-ESCAPE.—James Roberts, New York, N. Y., and Newton W. Palmer, Boston, Mass.

267,031. FIRE-ESCAPE LADDER.—Patrick H. Spelman, New York, N. Y.

267,035. ADJUSTABLE DOOR-SECURER. — James Streeter, Rochester, N. Y.

267,055. CLAMP FOR ADJUSTING DOOR-KNOB ROSES.—George V. Blackman, Oakland, Cal.

267,060. TOOL-HANDLE. — Edgar Buell, Clinton, Conn.

267,102. VENTILATING APPARATUS. — Emil H. C. Oehlmann, Berlin, Germany.

267,103. FAUCET.—Edwin F. Pierce, Milwaukee, Wis.

267,105. MANUFACTURE OF METALLIC DOOR-KNOBS.—Charles Puddefoot, Detroit, Mich.

267,109. PORTABLE HOUSE.—James Reilly, Sherbrooke, Quebec, Can.

267,114. APPARATUS FOR COOLING AIR.—John P. L. Simon, and Charles Abele, New York, N. Y.

267,128. HOT-AIR REGISTER. — James S. Bailey, Brooklyn, N. Y.

267,139. COMBINED LOCK AND LATCH. — Eugene Bourquin, St. Louis, Mo.

267,156. OVER-FLOW VALVE FOR WASH-BASINS.—William S. Cooper, Philadelphia, Pa.

267,168. SHUTTER-FASTENER.—Russell G. Dudley, Jersey City, N. J.

267,176. COMPOUND FOR CLEANING PAINTED AND VARNISHED SURFACES.—Albert Ford, Atlanta, Ga.

267,179. FIRE-ESCAPE. — Kasson Freeman, Grand Rapids, Mich.

267,190. WATER-CLOSET. — Stephen Goldner, Baden, Germany.

267,201. WINDOW-SASH.—William Heaps, Walden, N. Y.

267,217. ARTIFICIAL STONE, MARBLE, ETC.—Raphael Josia, Florence, Italy.

267,224. COMBINED SASH-FASTENER AND BURGLAR-ALARM.—Theodore E. King, Westport, Conn.

267,248. HOD-ELEVATOR. — Franklin Pierce, New York, N. Y.

267,256. VENTILATOR.—De Garmo Robbins, Rochester, N. Y.

267,260. T-SQUARE. — Joseph W. Rowe, Austin, Tex.

267,264. FUNNEL-TRAP FOR SINKS.—John G. Schill, Hoboken, N. J.

267,286. FIRE-ESCAPE. — Abraham Van Wagner, New York, N. Y.

267,290. CALIPERS. — Oliver D. Warfield, Springfield, Mass.

267,306. WATER-TRAP CLEANER. — John S. Gall, Rochester, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

WAREHOUSE. — Wm. Ferguson & Bro., architects and builders, are rebuilding the warehouse at the northeast corner of Howard and German Sts., for Alex. Rieman, 22' x 66', five-story and basement; cost, $11,000. First-story front, iron; balance, brick.

BUILDING PERMITS. — Since our last report nineteen permits have been granted, the more important of which are the following: —

Lawrence Turnbull, 6 two-st'y and basement brick buildings, e s Chester St., commencing s e cor. Chester and Keyser Sts.

Mrs. Jane M. Kelso, 3 three-st'y brick buildings, n s Baltimore St, w of Central Ave.

Western Maryland R. R. Co., two-sty brick building, n e cor. High and Hillen Sts.

F. C. Fossett, 2 three-st'y brick buildings, Belair Ave., between Hoffman and Washington Sts.

W. L. Stork, 8 three-st'y brick buildings, Madison Ave., between Prestman and Bloom Sts.

John Boyce, three-st'y brick building, Patterson Ave., between Cary St. and Stockton Alley.

Wm. G. Scarlett, 7 three-st'y brick buildings, e s Druid-Hill Ave., commencing s e cor. Laurens St.

Richard C. Wills, two-st'y brick building, Franklin St., between Bruue and Fremont Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Boylston St.*, cor. Clarendon and Newbury Sts., Ward 11, for Massachusetts Institute of Technology, four-st'y flat building for college purposes, 90' x 155'; James Fagin, builder.

Beacon St., No. 344, Ward 11, for Lucien Carr, four-st'y mansard dwell., 25' x 70'; L. P. Soule, builder.

Marlborough St., No. 244, Ward 11, for Henry Whitewell, three-st'y mansard dwell., 25' x 55'; Joseph E. Keening, builder.

Wood. — *Call St.*, near Everett St. and Carolina Ave., Ward 23, for R. C. Billings and Geo. Faulkner, 2 two-st'y flat dwells., 21' x 31'; John D. Wester, builder.

Call St., near Everett St. and Carolina Ave., Ward 23, for R. C. Billings and Geo. Faulkner, 2 two-st'y flat dwells., 21' and 33' x 31': John D. Wester, builder.

Bellevue St. near Trull St., Ward 1, for J. Homer Pierce and others, trustees, one-st'y mansard stable, 30' x 40'.

L St., near East Broadway, Ward 14, for Freeborn Adams, Jr., 2 two-st'y pitch dwells., 20' x 29'; J. H. Sears, builder.

Perkins St., near Prince St., Ward 23, for Daniel C. Shea, two-st'y pitch dwell., 23' x 25' 4"; ell 13' x 14'; Thomas O. Caugley, builder.

M St., No. 127, Ward 14, rear of, for H. C. Bowen, 4 two-st'y flat dwells., 19' x 28'; Wm. T. Eaton, builder.

West Seventh St., No. 55, Ward 13, for Edward Devin, three-st'y flat dwell., 23' x 26'; John Mulholland, builder.

Brooklyn.

CLUB-HOUSE. — The Hamilton Club, of Brooklyn, intend erecting a building, to cost $150,000.

BUILDING PERMITS. — *Columbia Heights, No.* 146, w s, between Wall and Fulton Ferries, four-st'y brick dwell., tin roof; cost, $25,000; owner, Isaac Henderson, 47 Seventh Ave.; architect, Thos. Stent; mason, R. L. Darragh.

Waverly Ave., w s, 250' from De Kalb Ave., two-st'y brick stable, tin roof; cost, $4,500; owner, A. G. Jennings, Park Ave., cor. Hall St.; architect, G. L. Morse; builders, O. Nolan and Morris & Selover.

Flushing Ave., s s, 146' e Garden Ave., three-st'y frame dwell., tin roof; cost, $4,600; owner, D. G. Shultz, North Eighth St., cor. Union Ave.; architect, Frank Holmberg; builders, H. Grasman and Jno. Rueger.

Jefferson St., n w cor. Central Ave., three-st'y frame tenement, tin roof; cost, $4,200; owner, A. Dudenpansen, 72 Central Ave.; architect, Geo. Hillenbrand; builders, W. Beir and M. Metzen.

Suydam St., No. 38, s s, 380' e Broadway, two-st'y frame dwell., tin roof; cost, $3,000; owner, Fred. Friedlein, Hopkins St.; architect, Th. Engelhardt; builder, Jno. Rueger.

Boerum St., n w cor. Old Bushwick Ave., three-st'y frame tenement, tin roof; cost, $6,000; owner, Mrs. Koebler, on premises; architect, Th. Engelhardt; builders, John Heilmann and P. Kunzweiler.

Twentieth St., No. 347, n s, e of Third Ave., 2 three-st'y frame tenements, felt roof; cost, each, $2,500; owner and carpenter, John R. Greene, 230 Twentieth St.; architect, W. H. Wirth.

Putnam Ave., s s, 90' e Marcy Ave., 17 two-st'y brownstone dwells., tin roof; cost, each, about $4,500; owner and builder, F. C. Vrooman, 444 Gates Ave.; architect, F. De W. Vrooman.

Forrest St., n s, cor. Evergreen Ave., two and three st'y brick wash and machine house, gravel roof; cost, each, $9,500; owners, S. Liebmann's Sons, Forrest St., cor. Bremen St.; architect, Th. Engelhardt; builder, G. Lebrian.

Baltic St., n s, 75' e Nevins St., three-st'y frame tenement, tin roof: cost, $3,000; owner, John Cline, 499 Baltic St.; architect, J. Freeman; builders, J. Haney & Co.

Eighth Ave., n e cor. Berkeley Pl., 4 four-st'y brownstone dwells., tin roof; owners, architects and builders, J. Doherty & Son.

Fourth Ave., cor. Flatbush and Atlantic Aves., gore lot, three-st'y brick store and office, mansard, slate and tin roof; cost, about $5,000; owner and builder, Thos. H. Brush, 704 Fourth Ave.; architect, F. E. Lockwood.

Cumberland St., Nos. 10, 12, 14 *and* 16, five-st'y brick factory, gravel roof; cost, $8,000; owner and architect, Daniel S. Hammond, 132 Willoughby St.

Chicago.

The unmistakable signs of approaching winter have had the usual effect of causing a marked diminution in the number of applications for permits for erection of the better class of dwellings. Contractors and builders are making all haste to enclose and roof those already under way, and not many more will be started now before the spring-time.

BUILDING PERMITS.—J. E. Pritchard, two-st'y brick flats, 22' x 51', 137 Clybourn Ave.; cost, $3,000.

Chas. Skeer, three-st'y and basement brick dwell., 62' x 75', 351 to 357 La Salle Ave; cost, $20,000.

P. Sullivan, three-st'y and basement brick store and dwell., 22' x 60', 504 Indiana St.; cost, $10,000.

N. K. Fairbank, three-st'y and basement brick factory, 72' x 100', 219 to 223 Eighteenth St.; cost, $13,000.

E. G. Russell, two-st'y brick dwell., 25' x 56', 245 Robey St.; cost, $7,000.

F. R. Otis, five-st'y and basement brick stores, damaged by fire, cor. State and Jackson Sts.; cost, $10,000.

H. Wollner, two-st'y brick store and dwell., 25' x 70', 3364 South Halsted St.; cost, $5,000.

Wm. Busby, 3 two-st'y and basement brick dwells., 40' x 50', 3204 Forest Ave.; cost, $6,500.

S. H. Curtis, two-st'y brick dwell, 20' x 40', 2500 Indiana Ave.; cost, $4,000.

J. H. Loveday, 3 two-st'y basement brick dwells., 50' x 54', Hoyne Ave., near Harrison St.; cost, $12,000.

C. W. Shonk, two-st'y and cellar brick dwell., 22' x 56' 188 Winchester Ave; cost, $5,000.

E. T. Ewing, 3 two-st'y brick dwells., 33' x 66', 3737 to 3741 Ellis Ave.; cost, $12,000.

Vaclav Horace R., two-st'y brick store and dwell., 20' x 50', Allport and Nineteenth Sts.; cost, $4,000.

Robert McMahon & Co., four-st'y and basement brick factory, 98' x 100', s w cor. Monroe and Clinton Sts.; cost, $15,000.

John McCarthy, three-st'y and basement brick store and dwell., 638 Centre Ave.; cost, $6,500.

Patrick Ahern, three-st'y and basement brick store and dwell., 1245 Milwaukee Ave.; cost, $6,000.

Bohemian Turner Society, brick basement, 48' x 90', 106 and 108 De Koven St.; cost, $8,000.

Mrs. A. Jedlicka, two-st'y and basement brick dwell., 21' x 44', 268 Taylor St.; cost, $3,500.

D. Donegan, three-st'y and basement brick flats, 69' x 80', 545 to 549 La Salle Ave.; cost, $20,000.

J. L. Stewart, two-st'y brick dwell., 20' x 50', 286 Leavitt St.; cost, $3,500.

J. H. Dole, three-st'y and basement brick dwell., 50' x 50', Elm St., near State St.; cost, $14,000.

H. W. Leman, three-st'y and basement brick dwell., Elm St., e of State St.; cost, $5,000.

Violet Gray, three-st'y and basement brick dwell., Elm St., e of State St.; cost, $5,000.

M. Mercer, two-st'y and basement brick dwell., 28' x 60', Honore St., near Jackson; cost, $7,000.

D. Burns, two-st'y and basement brick flats, 44' x 53', 583 and 585 Sedgwick St.; cost, $5,000.

P. McNamara, two-st'y and basement brick dwell., 33' x 48', 3443 and 3445 Indiana Ave.; cost, $6,700.

M. McDermott, two-st'y and basement brick store and dwell., 24' x 80', Halsted St., s of Twenty-sixth St.: cost, $6,000.

Thomas Cullerton, two-st'y brick store and dwell., 29' x 50' 9 Whitney St.; cost, $3,000.

J. Jerusalem, three-st'y brick store and dwell., 30' x 60', 562 and 567 North Halsted St.; cost $7,000.

D. Casey, two-st'y and basement brick dwell., 22' x 52', 2336 South Halsted St.; cost, $4,000.

Casey, Ogden & Parker, four-st'y and basement brick paint factory, Eighteenth and Brown Sts.; cost, $20,000.

O. Vider, two-st'y and basement brick dwell., 36' x 42', 525 Garfield Ave.; cost, $5,000.

Goss & Phillips Manufacturing Co., addition and repair building d maged by fire, Fisk and Twenty-second St.; cost, $12,000.

Marshall M. Kirkman, 3 two-st'y and basement brick dwells., 44' x 60', 726 to 630 Washington Ave. Boulevard; cost, $27,000.

S. Rothschild, two-st'y and basement brick dwell., 23' x 43' 662 West Adams St.; cost, $6,300.

P. T. Dodge, 2 three-st'y and attic brick store and dwells., 42' x 52', 501 to 507 Ogden Ave.; cost, $10,500.

Cincinnati.

BUILDING PERMITS. — Henry Myer, two-st'y brick dwell., Jefferson St., near Corry St.; cost, $4,000.

L. Schreiber & Sons, one-st'y brick dwell., 525 Walnut St.; cost, $2,500.

R. Atkinson, three-st'y brick dwell., Hopkins St., near Dalton Ave.; cost, $4,300.

Alex. McDonald, repair three-st'y brick store, Pearl St., near Walnut St.; cost, $3,500.

Six permits for repairs; cost, $3,500.

Los Angeles, Cal.

BUILDING PERMITS.—The Naudeau building is to be brick, three-st'y, and will cost about $125,000.

Rose's brick building will be three-st'y, and will cost $25.000.

The Laronde block is two-st'y, and will cost $14,000.

Mr. Luitweiler's extension to his building will cost $5,000.

Susskind's brick building, two-st'y, on Los Angeles St., near Requena, will cost $5,000.

Additions to the building occupied by the *Herald* and the *Express*, will cost $14,000.

Improvements on the Allen block will cost $11,000.

The Alexander building, only one-st'y, will cost $6,000.

The Bernard block will be two-st'y, and will cost $10,000.

P. Lalande is erecting a brick building, to cost $4,000.

Lewis Lichtenberger is erecting a two-st'y block, to cost $12,000.

New York.

RESIDENCES. — Mr. Maher is to have seven houses, of brick, with brownstone finish, four-st'y, built for him, on the cor. of One Hundred and Twenty-sixth St. and Fifth Ave., from designs of Mr. Jno. G. Prague. They will vary in size, having frontages of from 17' to 25'.

Mr. C. D. Thompson will have a house, 22' x 55' with 12' extension, built on One Hundred and Fourth St., 250' e of Ninth Ave. It will be of brownstone, three-st'y, and occupy a lot 50' x 111'; Mr. G. M. Huss is the architect; and Mr. J. Coar the contractor.

ALTERATIONS. — The old Armory Building on Twenty-third St., is to be altered into a theatre, at an expense of about $20,000, for Mr. Morse, from designs of Mr. H. Edwards Ficken. Work has already commenced.

The Hotel "Branting," Nos. 608 to 614 Madison Ave., is to receive extensive improvements. The building, which is now six stories high, is to be built up one, and in places two stories. The owner is Mrs. Sarah E. L. Taylor. The cost of the alteration will be about $135,000.

BUILDING PERMITS. — *Roosevelt St., No* 12, five-st'y brick tenement, tin and iron roof; cost, about $19,000; owner, Estate Eleonora R. Conkling, H. Conkling, executor, 27 East Tenth St., office, 3 Mercer St.; architect, B. McGurk; builder, John Fitzpatrick.

East Fifty-ninth St., Nos. 430 *and* 432, five-st'y brick factory, metal roof; owners, Heyman Bros. & Lowenstein, 182 Chatham St.; architect, J. B. Snook; builders, List & Lennon.

One Hundred and Nineteenth St., s s, 165' e Fourth Ave.; 2 five-st'y brick tenements, tin roofs; cost, each, $13,000; owner, Patrick Dempsey, 5 East One Hundred and Thirty-second St.; architects, Cleverdon & Putzel.

One Hundred and Forty-second St., n s, 72' w Eighth Ave., three-st'y frame dwell., tin roof; cost, $7,000; owner, Christian Brand, 1 West One Hundred and Twenty-fourth St.; architect, A. Spence.

Washington Pl., s s, 100' e Monroe Ave., two-st'y frame dwell., shingle roof; cost, $3,500; owner, Jacob Paulsen, One Hundred and Seventy-seventh St., cor. Railroad Ave.; architect, A. Arctander.

One Hundred and Forty-sixth St., n s, 60' e Morris Ave., 5 three-st'y brick dwells., tin roof; cost, each, $10,000; owner, Robert Huson, 218 East Fifteenth St.; architect, J. W. Marshall; mason, R. Huson.

ALTERATIONS. — *West Twenty-third St., No.* 116, one-st'y brick extension, interior alterations and front altered; cost, $5,000; owner, Geo. C. Schleier, Metropolitan Hotel; architects, D. & J. Jardine.

East Sixth St., Nos. 303 *and* 305, hay-loft altered

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for flat, etc.; cost, $3,500; owner, Matilda Jantzen, 104 Second Ave.; architect, J. M. Forster; builders, G. Staiger and W. T. Roylance.

West Seventeenth St., Nos. 104 *and* 106, three-st'y brick extension, etc.; cost, $5,000; owner, Thomas Kelly, 315 West Fifty-fifth St.; architect, J. M. Dunn; builders, N. & H. Andruss.

Philadelphia.

BUILDING PERMITS.—*Greenwich St., No.* 238, three-st'y dwell., 18′ x 44′; Geo. Roth, owner.

Canal St., cor. St. John St., third-st'y addition to factory, 16′ x 39′; Thos. McCarty, contractor.

Miller St., s s, e of Wistar St., two-st'y warehouse, 35′ x 60′; J. & B. Allen, owners.

Broad St., w s, n of Ellsworth St., 5 three-st'y dwells., 22′ x 70′; H. R. Shoch, owner.

Green Lane, n w cor. Mitchell St., three-st'y store and bake-house, 25′ x 26′; H. Wauklin, owner, Roxboro.

Fowler St., s s, w of Jefferson St., 2 two-st'y dwells., 13′ x 30′; Jas. Kenworthy, owner.

Kensington Ave., n w cor. Lehigh Ave., three-st'y dwell., 15′ x 28′; Jno. Torpy, owner.

Wayne Junction, cor. P. & R. Rd., engine and boiler-house and shed, 50′ x 90′ and 80′ x 218′; A. B. Rorke, contractor.

St. John St., e s, n of Willow St., four-st'y factory, 18′ x 68′; Stacey Reeves & Co., contractors.

Dickerson St., Nos. 210 *and* 212, two-st'y stable, 32′ x 35′; Benj. Hunt, owner.

Passyunk Road, s w cor. Tasker St., three-st'y store and dwell., 31′ x 56′; J. Bevlin, owner.

Twenty-sixth St., s e cor. Washington Ave., two-st'y office-building, 16′ x 30′; J. S. McHenry, owner.

Sansom St., n s, w of Twenty-first St., two-st'y stable, 21′ x 32′; R. W. Strode, contractor.

Wildley St., n s, bet. Fourth and Fifth Sts., four-st'y warehouse and office, 40′ x 40′; A. M. Greene, contractor.

Wharton St., s s, bet. Huhn and Jarden Sts., one-st'y car-shed, 96′ x 252′; Union Pass. R.R. Co., owner.

Cumberland St., cor. Twenty-sixth St., two-st'y dwell., 18′ x 31′; Chas. W. Hawes, owner.

Reed St., Nos. 1816, 1818, *and* 1820, 3 three-st'y dwells., 16′ x 42′; Jos. Stuckey, owner.

Fairhill St., Nos. 2841 *and* 2843, 2 two-st'y dwells., 12′ x 28′; Conrad Arnold, owner.

Hale St., No. 1749, two-st'y dwell., 15′ x 27′; Jno. Zoelle, contractor.

Glenwood Ave., n w cor. Twenty-first St., one-st'y stable, 32′ x 38′; J. Sims Wilson, contractor.

Barker St., n s, w of Seventeenth St., one-st'y storehouse, 18′ x 65′; Hinch & Hutchinson.

Twentieth St., e s, s of Kater St., two-st'y store-house, 17′ x 40′; M. McConnell.

Bethlehem Pike, n of Chestnut Ave., alteration and addition to dwell., 40′ x 127′; W. C. Mackie, contractor.

Thirty-third St., n e cor Walnut St., one-st'y addition to building, 40′ x 60′; L. Havens, contractor.

Queen St., n s, bet. Wayne and Knox Sts., 2 three-st'y dwells., 16′ x 47′; Wm. Garvin, contractor.

Meehan St., s s, e of Muskgrove St., 2 two-st'y dwells., 12′ x 40′; Wm. Garvin, contractor.

Levering Ave., s s, bet. Ridge Ave. and Mitchell St., 2 two-st'y dwells., 16′ x 41′; Wm. Eddleman, contractor.

Marshall St., w s, s of Norris St., 3 two-st'y dwells., 15′ x 45′; H. M. Martin, contractor.

Kensington Ave., e s, n of Adams St., two-st'y dwell., 16′ x 37′; L. L. Yates, contractor.

Fairhill St., e s, bet. Lehigh Ave. and Somerset St., three-st'y dwell., 17′ x 29′; E. Schmidt, contractor.

Otsego St., n e cor. Mifflin St., one-st'y factory; E. W. Rowley.

Brooklyn St., w s, n of Hamilton St., 2 two-st'y dwells., 16′ x 50′; H. Grau, contractor.

Twenty-sixth St., e s, s of Jefferson St., one-st'y chapel, 32′ x 52′; Jas. H. Young, contractor.

Brandywine St., No. 1506, three-st'y stable, 20′ x 62′; O. G. McMullen.

St. Louis.

BUILDING PERMITS.—Those worth $2,500 and over are as follows:—

Gus. Sporleder, two-st'y brick dwell.; cost, $5,000; Schaper, architect; H. Heitmann, contractor.

A. Mell, two-st'y brick store; cost, $6,000; F. W. Bruggeman, contractor.

Joachine Storjohann, two-st'y brick store; cost, $5,600; Pipers, architect; Chas. Wehking, contractor.

J. M. Schnaider, two-st'y brick dwell.; cost, $8,000; E. Jungenfeld, architect; Chas. Wehking, contractor.

J. S. Zimmerer, three-st'y brick dwell.; cost, $10,000; A. Beinke, architect; sub-let.

F. G. Gildringhaus, two-st'y brick stable; cost, $4,000; A. Beinke, architect.

T. Bolz, two-st'y brick dwell; cost, $3,500; C. F. May, architect; H. Drees, contractor.

H. C. Christopher, two-st'y brick dwell.; cost, $6,000; Cledus, architect; F. C. Bonsack, Jr., contractor.

B. Dierkes, two-st'y brick dwell.; cost, $4,500; J. A. Conlon, contractor.

General Notes.

ATHOL, MASS.—A Roman Catholic Church and parsonage are to be built here.

ATLANTA, GA.—Store building, brick, five-st'y, 30′ x 105′, for C. P. M. Barker; Messrs. Bruce & Morgan, architects, Atlanta.

Store building, brick, five-st'y, for W. W. Anstell; Bruce & Morgan, architects.

Remodelling stores for W. W. Anstell; Bruce & Morgan, architects.

Granite mausoleum for the Anstell family; cost, $16,000; Muldoon & Co., of Louisville, Ky., are the contractors, and the structure is to be erected under the supervision of Bruce & Morgan, architects, Atlanta, Ga.

BALTIMORE COUNTY, MD. — Frame dwelling for Robert Magruder; cost, $8,000. Frank E. Davis, of Baltimore, architect.

COLUMBUS, GA.—Frame residence for Soule Redd, 30′ x 50′; Bruce & Morgan, architects.

EASTON, MASS.—The Congregational Society has received about $7,000 toward rebuilding the church edifice recently burned. It is proposed to erect a $16,000 church.

FORT WAYNE, IND.—J. M. Coombs is now completing a block, of three buildings, 75′ x 80′ of brick stone finish, n w cor. of Berry St. and Broadway; cost, $25,000.

Also Mrs. B. Ocomner a brick house, stone finish, 40′ x 60′, on West Wayne St.; cost, $10,000.

Also the estate of Mrs. H. Merdlinger, a block of four store buildings, one-st'y, 70′ x 73′; cost, $3,500; J. F. Wing & Co., architects.

N. Y. C. & St. Louis R. R. is building a fine station-house, freight-house and round-house.

Milton N. Webber is building a brick residence on West Washington St.; cost, $4,500.

FRANKFORD, PA. — William A. Drown & Co. are building a three-st'y factory, 120′ x 200′, on Gillingham, Jefferson and Tackawanna Sts.

IRVINGTON-ON-THE-HUDSON, N. Y. — Extensive alterations and interior decorations to the residence of Mr. C. C. Worthington have been designed by Mr. W. A. Bates, of New York.

JACKSON, N. H. — A large addition, which includes a new dining-hall, is to be made to the Thorn Mountain House, at a cost of about $12,000, from designs of Mr. W. A. Bates, of New York.

LOUISVILLE, KY. — Of the building permits issued since last report, the following are those of $2,000 and over:—

I. D. Vaughan, brick dwell.; cost, $8,500; M. I. Wilson, architect.

W. T. Grant, brick dwell.; cost, $3,500.

W. Aikin, brick dwell.; cost, $7,000; M. I. Wilson, architect.

R. Lechlieter, brick store; cost, $3,000.

Blatz, Krebs & Co., brick dwell.; cost, $2,800.

MCCOY, OREGON. — Mr. Lomer is building a residence for Mr. Frizzele: cost, $3,000.

MUNROE, GA. — Brick and stone court-house, 65′ x 85′; Bruce & Morgan, architects.

MONTREAL, CAN.—The Canadian Pacific directors and a committee of the Montreal Corporation have come to an arrangement recently for the erection by the former of a monster depot, costing $2,000,000, in the east end of Montreal. The Council will contribute $200,000 cash, in addition to 225,000 square feet of valuable city property as subsidy.

MUSKEGON, MICH. — Hon. W. M. Harford is building a wooden dwelling costing $5,000; D. S. Hopkins, architect, Grand Rapids, Mich.

NASHVILLE, TENN. — A stone mansion, 60′ x 100′, is to be built for Col. E. W. Cole, from designs of Messrs. D. & J. Jardine, of New York. It will be in the Tudor style, two-st'y and attic.

NEW BRITAIN, CONN. — Large frame house for Thos. S. Hall; Robt. W. Hill, architect, Waterbury, Conn.

Dwelling for Chas. Church; Robt. W. Hill, architect, Waterbury, Conn.

NEWMAN, GA. — Brick residence for Capt. A. B. Berry; Bruce & Morgan, architects.

NEWPORT, N. H. — The Roman Catholics of this place are erecting a church of Gothic style, with open timbered roof and spire 75′ high; cost, $5,000; builder, H. R. Beckwith, Claremont, N. H.

NEWPORT, R. I.—Mr. W. G. Weld of Boston, is about to pull down the De Rham cottage on Bellevue Ave. and erect a costly villa on the same site.

NEWTON CENTRE, MASS. — Mr. F. A. Gardner is the owner of a semi-detached frame house, now being built from plans of Mr. O. F. Smith, architect. Size, 36′ x 42′. Two stories; Mr. Geo. L. Esterbrook, contractor.

NEW ROCHELLE, N. Y. — Work is to be commenced forthwith on the new school-house, the contracts having been awarded. Messrs. D. & J. Jardine, of New York, are the architects.

NORTHAMPTON, MASS.—P. R. Whitcomb will build at once two more cottages on the new Bright St.; F. F. Pratt is already making the plans.

A fire-engine house is to be built at a cost of $4,000.

NORTH LONG BRANCH, N. J.—Frame cottage is to be built for Mr. Sam'l. Harris; from designs of Messrs. Lamb & Rich, of New York.

OCEAN BEACH, N. J. — Eben C. Jayne, Esq., of Philadelphia, is about to build two cottages, 40′ x 60′; Benj. Linfoot, architect, Philadelphia.

House and stable for Thos. Bolles, Esq., of New York; Benj. Linfoot, architect.

PEEKSKILL, N. Y. — Two-st'y cottage for N. G. Foshay; cost, $3,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

PITTSBURGH, PA. — A house and stable are to be built for I. C. Schwartz, of brick and terra-cotta, from designs of Mr. C. W. Romeyn, of New York, to cost about $40,000.

POINT LA BELLE, CONN. — H. W. Collender, Esq., 768 Broadway, New York City, is building two cottages here; cost, $14,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

RAYMOND, ME. — A union chapel is to be built here.

READING, PA. — The Equitable Building and Loan Association have begun to build a series of twin dwells., 28′ x 50′; J. J. Deery, architect, Phila

Geo. M. Ermentrout, Esq., is building a house, 17′ x 30′ and 34′ x 44′; from plans by J. J. Deery, architect, Phila.

ROANOKE, VA. — For the Shenandoah Valley, R. R. Co., a four-st'y office building, to be of stone and brick, with tile roof; Geo. T. Pearson, architect, Philadelphia.

Chapel building, 40′ x 48′; Geo. T. Pearson, architect, Philadelphia.

A block of four-st'y stores and offices, 50′ x 238′, to be built by the Roanoke and Land Improvement Co.; Geo. T. Pearson, architect, Philadelphia.

ROCHESTER, N. Y. — A large brick building on North St. Paul St., to be used as a dormitory for the Western New York Institution for Deaf Mutes; to cost $10,000; J. G. Cutler, architect.

School-building on North St. Paul St., for Western New York Institute for Deaf Mutes; to cost $8,000; J. G. Cutler, architect.

The new depot for the N. Y. C. & H. R. R. Co., on Atwater Street, is nearly ready for roof. The work of tearing down old depot will be commenced on the 1st, as trains will be run on new elevated tracks by the 8th of October.

RYE, N. H. — J. C. Philbrick & Son have commenced building the new "Farragut House" on the site of the hotel of the same name destroyed by fire last April. It is to be 288 feet long, and will contain, beside its public apartments, one hundred and four rooms. The cost will be about $50,000. Mr. S. J. F. Thayer, architect, of Boston; M. C. Foster & Son, contractors.

SALEM, OREGON. — J. Sherwin, of Portland, Oregon, has prepared plans for a brick bank building three stories high; cost, about $25,000.

SAN ANTONIO, TEXAS. — A cottage is to be built for Mr. I. S. Rockwood, to cost about $5,000; also a similar priced one for Mr. Leonard Jacob, both from designs of Messrs. Price & Freeman, of New York.

SEABRIGHT, N. J.—Mr. W. Sheppen, Jr., is building another cottage from designs of H. Edwards-Ficken, of New York.

SOUTHINGTON, CONN. — The Second National Bank just organized, together with the Savings Bank will immediately erect a bank building of stone, brick, and terra-cotta, 25′ x 55′; Palliser, Palliser & Co., architects, Bridgedort, Conn.

SPRING LAKE, N. J.—House, 48′ x 50′, for B. H. Yard, postmaster; plans by Palliser, Palliser & Co., architects, Bridgeport, Conn.

Presbyterian Church, to be of stone, frame, and tile, 40′ x 60′; seat 600; Benj. Linfoot, architect, Philadelphia.

STOCKBRIDGE, MASS. — The foundation is being laid for a new Methodist Episcopal church.

WASHINGTON, D. C. — Church, St. Mark's Episcopal, cor. Third and A Sts., stone; style, Gothic; seating capacity, 800; cost, $30,000; C. E. Cassell, architect, Baltimore.

WATERLOO, IA. — Residence for J. L. Girton; cost, $4,000; D. S. Hopkins, architect, Grand Rapids, Mich.

COMPETITION.

BATTLE MONUMENT.
[At Monmouth, N. J.]

Designs and specifications for a monument to commemorate the Battle of Monmouth are invited by the Committee on Designs, to be submitted in accordance with the terms of a Circular of Information as to purpose, location, material, cost, competition and award, including premiums for accepted designs; copies of which circular may be had by addressing

360 JOHN B. CONOVER, Treasurer,
FREEHOLD, N. J. P. O. Box 353

PROPOSALS.

SUPPLIES.
[At San Antonio, Tex.]

SAN ANTONIO ARSENAL,
SAN ANTONIO, TEX., October 25, 1882.

Sealed proposals, in triplicate, upon the blank forms furnished from this Arsenal only, will be received by the undersigned **until 12 o'clock, M., on Saturday, November 25, 1882,** for furnishing the supplies, in such quantities and at such times during the fiscal year ending June 30, 1883, as the Commanding Officer of this Arsenal may require, viz.: Thread, cotton cloth, iron, lumber, leather, cement, sand, lime, paints, oils, bricks, stone, etc.

A preference will be given to articles of domestic production. Catalogues, giving the estimated quantities and articles required, can be had on application at this Arsenal. Also, full information as to the manner of bidding, conditions to be observed by bidders, and terms of contracts and payments.

The Government reserves the right to reject any or all bids. JOHN A. KRESS,

360 Captain of Ordnance, Commanding.

SCHOOL-HOUSE.
[At Chicago, Ill.]

CHICAGO, November 12, 1882.

Sealed proposals will be received at the office of the Board of Education, No. 85 Fifth Ave., **up to 12 o'clock, noon, of Monday, 27th inst.,** for the carpenter, cut-stone, and sewer work and materials required in the erection of a school-house, on the corner of Wabash Ave. and Twenty-sixth St., in accordance with the plans and specifications prepared by James R. Willett, Architect and Superintendent of Construction of the Board, to be seen at the office of said architect, Merchants' Building, corner La Salle and Washington Sts.

Proposals to be made on printed forms to be obtained at the office of the architect. Persons making proposals for the above work will be required to deposit with the clerk of the Board a sum in cash equal to two and a half per cent. of the amount of their bid, to be refunded to each bidder whose bid is not accepted, immediately after the action of the Board upon such proposals, and to each bidder whose bid is accepted, as soon as satisfactory bonds for the fulfillment of his contract are filed with the Clerk of the Board.

Proposals to be addressed to the Chairman of the Committee on Buildings and Grounds, indorsed "Proposals for Mason-work."

The Committee reserve the right to reject any or all proposals received, at their discretion.

J. W. GARVEY,
WILLIAM FLOTO,
M. J. DUNNE,
360 Committee on Buildings and Grounds.

GLASS.
[At Philadelphia, Pa.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 14, 1882.

Sealed proposals will be received at this office **until 12 M., on the 2d day of December, 1882,** for furnishing and delivering, ready for fixing in place, all the plate, double thick sheet and double-thick ground glass required for the Court-House and Post-Office at Philadelphia, Pa., in accordance with specification, schedule and diagrams, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

361 JAS. G. HILL, Supervising Architect.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL XII. Copyright, 1882, JAMES R. OSGOOD & CO., Boston, Mass. No. 361.

NOVEMBER 25, 1882.

Entered at the Post-Office at Boston as second-class matter.

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MESSRS. EIDLITZ, RICHARDSON and OLMSTED, the architects of the new Capitol at Albany, have presented to the Governor of New York a reply to the report of the Commission recently appointed to examine the condition of the vaulted ceiling of the Assembly Chamber, which, whatever may be the merits of the controversy, is in itself an admirable document, —clear, unassuming, and to the point. Without contradicting any assertions or arguments of the Commission of experts, the architects claim that the experts were misled by accidental appearances into the belief that settlements had taken place which do not really exist, and that reasoning from these false premises they reached a conclusion in regard to the stability of the building which was not entirely warranted. In the determination of amounts and direction of strains in the ribs of the vaulting, and the thrusts upon the abutments, the experts of the Commission agree substantially with the architects. They criticise the manner in which the side-vaults of the ceiling are balanced, but this is a comparatively small matter, their greatest apprehensions being founded on the use of iron ties for resisting the strains in the stone-work, and on the unequal and severe pressure upon the foundation. To these points the architects reply by figures showing that under the greatest extremes of heat and cold, the tensile stress upon the iron tie-rods will not exceed eighty-five hundred pounds per square inch, which is less than half the safe load, and hardly more than one-ninth the breaking strain; and by a record of levels, indicating that some apparent settlements in the building are nothing more than inequalities in construction, while all indication of actual settlement has ceased. The conclusion reached by the Commission — that the stone ceiling of the Assembly Chamber should be removed and replaced by a wooden construction — is for these reasons rejected by the architects, who say that the rapidity with which the ceiling was erected is in itself sufficient to account for the settlements which have cracked the stones of the ribs, but that these movements have now ceased, and there is no probability of any further change in the work; but that when the broken stones have been replaced, and the joints repaired, the stone ceiling will be a perfectly sound and permanent structure.

THE explorations at Assos, which have been continued this year under the care of the Archæological Institute of America, have met with gratifying success, the various buildings of the city having been more definitely measured and studied, and many interesting sculptures and objects of ancient Greek art secured. Notwithstanding the modest scale of expenditure of the exploring party, a further supply of money is needed to continue the work, as the laborers must be paid, even though the best of the service, that of direction and recording results, is performed in great part by volunteers. About twenty-five hundred dollars is asked for, and ought to be promptly raised. The Boston Society of Architects, learning through one of its members that contributions would be acceptable, promptly voted a hundred dollars out of its own funds, and there is no doubt that other associations in the profession which has furnished most of the members of the expedition would be glad to do the same. By the skilful and enthusiastic effort of young architects from New York and Boston a great addition has been made to our knowledge of Greek art, and as they regard the appreciation of their brother architects as their best praise, so ought the profession in return to take special satisfaction in sustaining and encouraging their efforts.

THE New York Board of Trade and Transportation has taken the serious step of adopting resolutions recommending the appropriation by the Government of all telegraph and telephone lines as a part of the postal system, following the example of all, or nearly all, European countries. Similar action has already been taken by the National Board of Trade at its last two annual meetings, and the idea has evidently taken strong hold upon the public. One weighty argument in favor of the change is that by making the telegraph an adjunct of the postal-system, every post-office may be made a telegraph-office, without any extra expense of maintenance, to the great benefit of many towns, and even cities, which, with a very large postal business, have now no telegraphic communication with the rest of the world. There may be some fear that the government administration of the service would be less efficient than that of a private corporation, and the complaints which were formerly made of the English postal-telegraph are fresh in the memory of every one; but we must remember that the post-office is, or has been, perhaps the best managed department of the government, while the administration of our private telegraph-lines is not, to say the least, everything that might be desired. Moreover, the genius of all our people, including those of them who govern the remainder, is strongly in favor of improvements in the way of rapid and certain communication, while the English Government looked at first upon the telegraph as an invention "of which it could make no use," and even now is said to view the telephone with a somewhat unfavorable eye. If an American postal-telegraph could be managed as well and as cheaply as the Continental systems, no business man would regret the change, and if the lines are ever to be transferred from private hands to the public custody, the present is perhaps the most favorable time for the transaction.

A SINGULAR accident has occurred in the manufacturing town of Hautmont, in France. One of the buildings belonging to a large chemical laboratory was built on made ground, filled in some fifteen years ago with coal cinders and mineral refuse, particularly iron pyrites which had been calcined. The structure was only completed last year, and now a fire has broken out in the ground beneath it, which has worked so far in the combustible material as to cause serious settlement, threatening the ruin of the building, which cost six hundred thousand francs. Such fires are very difficult to reach or control, and the owners of the laboratory are nearly helpless; but efforts have been made to saturate the ground with water, adding also chloride of calcium, which is produced in the establishment, although so far these attempts have not met with much success.

A CASE exactly parallel to that at Hautmont is reported from New Jersey, at the works of the New Jersey Steel and Iron Company, where for many years cinders and refuse have been thrown into the river until they have formed an artificial territory said to be six acres in extent. Upon this several buildings have been erected, including the bridge-shop, a structure three hundred feet long, and the template-shop, used for storing patterns. A few days ago smoke rising from the surface of the ground arrested the attention of a workman, who searched for the cause, and found the material actually burning on the edge of the bank. Now the extent of the subterranean conflagration is estimated at an acre, and the fire is at work directly under the bridge-shop, and is approaching the template-shop. Smoke rolls up from the surface in many places, and the heat is very sensibly felt by persons walking over the affected ground, while an iron bar driven twelve feet into the mass is red-hot when drawn up. Efforts are being made to extinguish the fire by digging trenches and filling them with water, so as to ensure a thorough soaking of the ground about them, but the task is an unpleasant one on account of the heat of the mass below the surface. A similar but less extensive fire is said to have occurred at the works several years ago.

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The French Minister of Commerce has addressed a letter to the prefects under his control, calling their attention to the report of the Council of Hygiene for the Department of the Seine, which condemns the use of leaching cesspools, and recommends that such should be permitted only by special license in exceptional cases, as for instance, where manufactories, completely isolated, and at a great distance from any dwelling-houses, should be able by means of a tight pipe to discharge waste liquids into a porous stratum separated by beds of impermeable formation from any water-bearing stratum made use of for supplying wells; advising also that such licenses should be made subject to revocation at any time. To these views, the Minister says, the General Committee of Public Hygiene of France has substantially given its adhesion, and so far as regards manufactories he has himself approved them, and requests that henceforth the rules recommended should be carried out in such of these establishments as the various prefects may be called upon to authorize. In regard to private dwellings and small workshops, he considers that both the suppression of cesspools and the surface irrigation which is recommended in place of it present grave practical difficulties, which should not be encountered hastily; and he asks that the subject may be brought immediately to the attention of the local and departmental boards of health, that they may inquire into the matter, and submit reports upon it. We shall hope to learn more of the results of this investigation, which is one of the most important ever undertaken in any country. The French have hitherto been regarded as being decidedly behind the rest of the civilized world in sanitary matters; but if they succeed in discovering and adopting in practice a satisfactory substitute for the leaching cesspool, they will have done more for the health of mankind than all other nations together since sanitary science began.

A company has been formed in New York for the transmission to subscribers of correct time by means of electric currents from a central regulator clock to dials set anywhere that may be desired. The dials are of very simple construction, containing no machinery except one or two ratchet-wheels and an electro-magnet, and nothing is necessary to keep them in working order except the occasional replenishing of the battery in each building. Unlike the pneumatic clocks, which are already in use in New York, the electric time-pieces can, and probably will be, all regulated from one central station, where an absolutely correct standard can be maintained. According to the *Evening Post*, the cost of subscription is to be very moderate, varying from twenty-five cents to one dollar per month, according to the character of the dials used. We hope that the *Post's* information as to the prices is correct. At three dollars a year, the luxury of possessing a correct time-piece is one that would seem cheap to every householder, and the company may rest assured of having all the business that it desires.

A discussion is going on in some of the papers about the merits of the new elliptical lead pipe made for plumbers' use, and recommended as being proof against bursting by the freezing of water in it. The theory of its design is that the expansion of congealing water, instead of tearing the walls of the pipe asunder, as it must with one of circular section, in which the perimeter is the least which will contain the given volume, acts in the elliptical pipe merely to push out the flatter sides of the ellipse, bringing it more nearly to a circular form. This process, it is claimed, can go on until the section of the pipe is changed to a circle, when, the maximum capacity for the given perimeter being reached, a further expansion will cause the walls to give way. There is, as some object, the difficulty about this explanation that the body of water contained in the elliptical pipe must in freezing expand in all directions, and, it would seem, with the greatest force in the direction of the longer axis of the ellipse, whereas the theory of the pipe supposes the stretching of the pipe to take place in the direction of the shorter axis, the length of the ellipse actually diminishing to accommodate the stretching of the metal in the transverse direction. The controversy would be best settled by the summary process of filling a piece of the elliptical pipe with water and freezing it, but in the absence of this direct testimony we are inclined to think that the plasticity which freezing water undoubtedly possesses may account for the superiority of the elliptical pipe. At the first congelation a greater resistance would certainly be presented to the expansion of the water in the direction of the longer than of the shorter axis, since it would be easier to bend than to stretch the metal, and by regelation, or in some other way, the particles might accommodate themselves to the forces opposed to them so as to produce the effect described. For some reasons, however, a pipe of octagonal or corrugated section, like that of the expanding water-conductors now so extensively used, would be more convenient than one of elliptical form, and we hope that it will not be long before something of the kind will be manufactured for use in our trying climate.

Some very interesting discoveries have been made in Lower Mesopotamia, by M. de Sarzec, the French Consul at Bassora, who seems to have been the first to brave the dangers from malaria and marauders which have hitherto made explorations in the valley of the Euphrates impracticable. Since the destruction of Babylon by Cyrus the surrounding region, partly, perhaps, on account of the diversion of the course of the river by which the city was entered, and partly from the obstruction caused by the ruin of buildings on its banks, has become marshy and unhealthy, and at certain seasons is completely overflowed; so that M. de Sarzec found no small difficulty in continuing his work, but after five years' labor he has at length sent home to Paris a collection of objects which differ in many respects from any others in the world. Near an artificial channel for irrigation which seems to have been made by the ancient Chaldæans, M. de Sarzec found a spot called by the Arabs "Tello," or "the Mounds," from the number of hillocks which cover it, and here commenced his excavations, which soon brought to light a great variety of statues, large and small, bas-reliefs, statuettes and utensils in bronze, stone and terra-cotta. These objects seem to belong to several different periods, some being of the most archaic character, and marked with inscriptions in a Chaldæan hieroglyphic somewhat similar to that of Egypt, while others show only the more modern cuneiform alphabet. Besides portable objects, the excavations have exposed the substructure of an extensive palace, raised, like those of Assyria, on an artificial mound of brick, fifty feet above the surrounding plain, and still preserving the partition-walls which divided it into apartments. Everything so far found which could be transported has been brought to France, and is now in place in the new Assyrian rooms in the Louvre, where the whole can be studied with care by the best archæologists in Europe.

A serious effort has at last been made to do something toward raising funds for the erection of the pedestal in New York Harbor for the reception of Bartholdi's colossal statue, and a public meeting has been called in aid of the project at the Academy of Music for November 28. Various distinguished persons are expected to be present, to add brilliancy to the occasion and inspire contributors by their eloquence. The whole amount to be raised is fixed at two hundred and fifty thousand dollars, and conditional subscriptions amounting to one hundred thousand have already been secured. If real interest could be excited in New York there should be little difficulty in obtaining the necessary additional amount, and the indications are very favorable for such a result. The managers of all the best theatres in the city have volunteered to give special entertainments for the benefit of the fund, and the example of their liberality will probably be followed by others. Fortunately, the foundation of the pedestal is already laid, so that the work of construction can be prosecuted through the winter, as will certainly be necessary if it is to be ready for the reception of the statue next summer.

Mr. William Henry Hurlbert, the editor of the New York *World*, has had the good fortune to persuade his friend, Mr. Munro Butler-Johnstone, to lend for a time his picture by Raphael, known as the Madonna dei Candelabri, to be exhibited at the Metropolitan Museum of Art; and if the officials of the New York Custom-House can stretch their clemency so far, it will appear in a conspicuous place at the Loan Exhibition which is soon to be opened. This is said to be the first genuine picture by Raphael ever brought across the Atlantic, and it will naturally excite much interest among the many people in New York who know the greatest of painters only by name. We trust that it will meet with due appreciation and the best of care among us, and that the happy thought of Mr. Hurlbert may inspire others who can influence the owners of beautiful pictures to imitate him for the public benefit.

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PLUMBERS' TRAPS.

NUMEROUS experiments to test the efficiency of plumbers' traps have recently been published. Their combined results are such as to embarrass, and in some cases to have befogged the reasoning of writers on the subject. Their most positive effect has been to expose a pre-existing ignorance concerning the conditions controlling this part of the work of the sanitary engineer, which was well-nigh universal. Their influence in enlightening this ignorance seems to have been incomplete. Preconceived ideas still hinder the full acceptance of their teachings.

The chief of these preconceptions is the idea that efficient security is given by a water-seal S-trap supplied with a vent-pipe of practicable diameter, running from its highest point to the open air. Another is that mechanical traps, like Bower's and Cudell's, are useless, because they allow air to be drawn through them, in the direction of the flow, and that they lose a part of their water; the criticism not being limited in the case of Bower's trap to the fact that it sometimes loses so much water that its ball drops away from and opens the mouth of its inlet-pipe.

The demonstrated facts seem to me to be as follows:—

1. We have discovered no trap of any kind that is substantially perfect.

2. Water-seal S-traps, even when "vented," are not safe under all, nor under nearly all, circumstances. Practically "you may trust them as far as you can see them," and no farther, and even then only when you do see them constantly.

3. Traps closed by floating balls are practically safe, so long as the water to which the flotation is due is maintained at a sufficient height, and so long as the ball maintains its buoyancy. As neither of these conditions is necessarily permanent, these traps need watching, also.

4. Traps closed by hinged valves are never safe.

5. Traps closed by balls resting on submerged seats are more or less good according to the closeness of the joint. They are, if of such form as to keep themselves clean, and when well made, the only trap thus far devised that may be trusted without watching: but with a somewhat doubting trust, even then.

The influence of preconception is shown at every turn in the discussions referred to. Mr. Philbrick shows the futility of the venting device by repeated experiment, thus: [See *American Architect* for September 9 and 16, 1882.] (A—4.) A 2-inch trap on a 2-inch waste had a 1-inch vent-pipe 28 feet 6 inches long; its seal was 1⅜ inches. In nine experiments with the discharge through it of a pail of water it lost its seal twice. (A—5.) A 1½-inch vent, 50 feet long, being substituted, this trap lost 1 inch of its seal in five trials out of ten, so that a second use without replenishing it would probably have unsealed it. (B—2.) A 4-inch trap on a 4-inch soil-pipe, with 1⅞-inch seal, had a 1½-inch vent-pipe 1 foot long. The discharge of a pail of water destroyed its seal three times out of ten. (B—3.) Increasing the vent to 2 inches, the discharge of six pailfuls broke the seal once, and nearly broke it twice. (B—4.) Increasing the vent to 3 inches (still 1 foot long), ten pailfuls broke the seal once, and reduced it to less than half its depth six times. (B—10.) "Under conditions which indicated perfect security, with a pipe 1 foot long and 1½ inches in diameter on a 4-inch trap, a coil of pipe 50 feet long coupled to the vent rendered it inefficient once in eight trials—the trap having 2 inches seal being siphoned in this case—and lost 1 inch of water three other times out of the eight. In another case, where a short vent of 1 inch in diameter seemed to be quite efficient, a coil of 1-inch pipe, with a length of 28 feet 6 inches, being coupled to it rendered the vent of apparently little use, for the trap lost its seal at every trial." (E.) He concludes that with ordinary hopper-closets used for emptying slops "it is difficult to preserve the seal in the ordinary form of S-trap, even by a vent-pipe attached thereto, unless this be applied directly to the crown of the trap, and be as large as 4 inches in diameter for at least a foot above the trap."

With these conclusive data under his eye, Mr. Philbrick says: "The ordinary S-trap alone, with ample air-vent, is therefore recommended for use under water-closets, and also for all other fixtures where its proper ventilation can be secured within reasonable limits of expense." He recommends that such ventilation should in every case "be severely tested by repeated trials," but he seems not to have noticed how little prospect of universal success he has left to the "ventilating" system, nor how little basis for his preconception. Farther on, Mr. Philbrick repeats his recommendation thus: "The best and most simple remedy for the siphoning of traps, in most cases, is undoubtedly to be found in the introduction of air at the normal pressure at the crown of the trap."

The *Sanitary Engineer*, in introducing Mr. Philbrick's report, with a tenacity worthy of a sounder holding says: "We have heretofore often urged on our readers the importance of providing air-vents for every trap, and if it needed any further proof it is to be found in these experiments."

This set of experiments included the testing of Bower's and Cudell's traps, yet, although the ball, in the case of each, remained against its seat, they are not deemed worthy of notice in the "Conclusions and Recommendations."

Mr. Hellyer's experiments are hardly worthy to be mentioned in connection with Mr. Philbrick's, but it should be stated that his somewhat inconsequent conclusions as to the venting of S-traps are similar. Some of his results may have been influenced by the direction of his soil-pipe, and most of his reasoning is based on experiments with two-inch wastes. His processes are illustrated by the fact that he found that 110 linear feet of air were drawn through his Bower's trap (*from* the house *to* the drain), that the water was constantly agitated, that the ball "did not keep its seating three seconds together"—in short, that it behaved exactly as it is intended to behave,—and that he blindly concludes: "this test proved that this trap also requires ventilation." In one case from which he reasons he evidently had an effect of *pressure* in the atmosphere of the soil-pipe.

Dr. Lissauer, of Dantzic, has made some notable experiments, which would be more useful if we knew the condition of the drain from the house to the sewer. It was *supposed* not to be trapped, but the fact that nearly, if not quite all of his results showed that the pouring down of water produced a compression of air in the soil-pipe, causing a forcing of the trap toward the house—not a rarefaction, causing "siphonage"—it is presumable that this channel was in some way obstructed. From the fact that the flame of a taper placed in an empty trap was drawn outward, he argued a movement of the air toward the sewer. It may have been only a movement toward the open top of the soil-pipe. That the movement was most active on stormy days indicates that this was the case, as the sewers of Dantzic are not connected with an open outlet. The compression caused by the descent of water in the soil-pipe sometimes blew out the taper, or when the trap was sealed forced its water over the house end of the trap.

Renk's experiments in Munich were in the main confirmatory of Lissauer's and Philbrick's: they developed nothing new as to siphonage.

My own experiments agreed with neither. They indicated the constant efficiency of the free ventilation of the soil-pipe alone. In one sense they are of little value, for the experiments of others show that under other conditions the open top of the soil-pipe may fail to protect the trap. It is possible that one of the causes of the differences between Mr. Philbrick's results and mine is to be sought in the fact that his soil-pipe was new and smooth, while mine was old and probably retarded the flow of its water.

The sum of all the testimony very decidedly demonstrates the impossibility of maintaining the water-seal of traps, not larger than the pipes they protect, *either by ventilating the soil-pipe, or by ventilating the traps themselves;* that is, of maintaining them at all times.

The deduction from this is inevitable: whether ventilated or not, such traps must be used only where their unsealing will be at once detected; practically that they must be used nowhere. Deep water-closet traps are sometimes large enough to allow the passage of air without becoming unsealed, but for all other uses some other device *must* be adopted if we are to avoid the danger of unsealing under certain combinations of flow. Each trap may be subjected to tests more severe than it can possibly undergo in practice, and it may (with an open soil-pipe, it probably will) be found safe, but without such testing no small trap can be trusted. Large traps are inadmissible, foul cesspools. The fact that the ventilation of the trap itself is found effective cannot be accepted, for in use the ventilation may, and probably will, soon become obstructed by deposits.

Those who, controlled by their preconceptions, still look to trap-ventilation for relief, should read again and ponder well Mr. Philbrick's results as to the relations between the size and the length of ventilation-pipes. Surely those Boards of Health which insist on such ventilation should now modify their regulations. The inadequacy of the system to meet all conditions—even when traps and pipes are new and clean—condemns their judgment in the matter. And these traps and pipes are clean only before they are used. Subsequent examination shows that the mouth of the vent at the top of the trap quickly catches deposits, and often becomes quickly closed by them, soon turning our fancied protection into an unsuspected failure. It is my own opinion that if all the traps in a house were vented as required by these sanitary authorities, the venting would soon become *nul* in most of them, and that the traps where it remained effective would become unsealed by evaporation (due to the draught immediately over them) much more often and more thoroughly than, without venting, they would have been unsealed by siphonage.

Then again, trap ventilation-pipes are usually made with lead (thin lead at that), and every unnecessary foot of lead pipe in the drainage-work of a house is an added danger to be avoided so far as may be. We must bear in mind, also, the great addition to the cost of the work that this modern hypothetical cure for bad trapping entails on the householder,—whose interests we are in duty bound to regard, at least to the extent of imposing on him no extra charge for uncertain benefits.

Some importance is attached to the effect of trap-ventilation in es-

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tablishing a needed current through long lateral waste-pipes. A much more radical and better way to meet this need is to do away with long lateral wastes altogether. We have tried long enough to learn how we may safely maintain the widely diffused baths and basins characteristic of the "first-class" houses of a year or two since. I have hitherto believed that this end might be secured, but I abandon the belief. Prudence demands that while we should—as we safely may — provide what is necessary for reasonable conveniences and comfort, we should limit as much as may be the distribution of plumbing appliances. In pursuance of this policy we can place all vessels requiring waste-pipes so near to the perfectly ventilated soil-pipe that the ventilation of lateral wastes may be disregarded.

Until we shall have learned enough of the processes by which traps are siphoned to prevent such siphoning under all circumstances —and we shall learn this sooner or later—we cannot do better than to avail ourselves of the nearly complete protection afforded by mechanical traps. Philbrick and Hellyer seem to assume that the condemnation of Bower's trap should follow their discovery that its water may be lowered by siphonage, but neither of them secured, with an open soil-pipe, the dropping of the ball away from its seat.

Mr. Philbrick says, "Air was now readily sucked up through the trap by the mouth in spite of its ball." He says in another connection, but with a suggested inference, "We live in a climate where artificial heating of houses, warm chimneys, and the careful closing of wall and window cracks, combine to produce a decided pressure of air from without the house inward, acting through all our house-drains through several successive months every year, and (that) we know of no method, as yet, so satisfactory for resisting this pressure as the use of water-sealed traps." Preconception again. Did Mr. Philbrick ever use a nargileh where a water-seal of several inches offers no appreciable obstruction to the inhalation of the idlest and drowsiest smoker? He would probably accept one and a half inches depth of seal as sufficient for a wash-basin trap. Such a seal will yield to a variation of barometric pressure of four-tenths of one per cent. Surely the ball of Bower's trap would offer an important additional obstruction, even though not absolutely tight. Then again, we should rather look to the supplying of the draught of our chimneys by other simple means of ventilation—necessary for other reasons. This done, the suction on our drain-trap ceases.

He dismisses Cudell's trap — which in my judgment represents a most useful class—with the statement that siphonage removed all its water. No doubt it did and often does. It is only then that this class of trap possesses an advantage. When the water is withdrawn the wet ball rests on a wet seat, and closes the opening against any interchange between the atmosphere of a properly ventilated soil-pipe and that of any even slightly ventilated room.

Cudell's trap is not suitable for wash-tubs and sinks, where Bower's trap, exposed to view, is better; but imperfect though it is, it is the best yet introduced for baths and basins. It is surely to be used — always — in preference to a simple S-trap with a back ventilation-pipe, that may to-morrow become clogged and useless, and which constitutes another artery of the drainage system subject to injuries and imperfections which may deliver into the house the impure air of that system.

George E. Waring, Jr.

ART IN PHILADELPHIA.

THE FIFTY-THIRD ANNUAL EXHIBITION AT THE ACADEMY.

By holding its annual exhibition in the fall instead of in the spring, as heretofore, the Academy secures a few pictures that have already figured in the spring exhibitions at New York and elsewhere. The gain from this source is, however, very slight in the present instance, and it is more than doubtful whether it is sufficient to compensate for the loss caused by holding the most important exhibition of the year at a season when the artists can hardly be expected to have much to exhibit except the contents of their summer portfolios.

That the present exhibition is not more truly representative of anything in particular is partly to be attributed to this cause, no doubt, though I cannot help fancying that there must be other reasons why the very liberal offers of the Academy officials have elicited no heartier response from the artists, especially those residing abroad. For to defray the expense of transportation and insurance on all works accepted by a jury of artists in Paris is certainly a generous thing to do, and one which, so far as I know, no similar institution in the country has offered to do.

No, it can hardly be the Academy's fault that the display from Paris is so meagre, even when the fullest allowance is made for the blunder of changing the date, to which allusion has already been made, and for the somewhat hasty commission, for which due apology is made in the catalogue. Shall we say it is the artists' own fault, and that they have not done their share toward making a success of an enterprise designed to aid them so directly? Or shall we infer that the encouragement they have received on former occasions has not been such as to attract to us now the first fruits of their industry? I am afraid this last is nearer the truth, and that the present display would have been much more brilliant if an admiring public had shown a little more substantial appreciation of the very admirable work which has been sent in former years.

As an indication of what Philadelphia painters have been doing, the exhibition is even more unsatisfactory than is its foreign contingent. Of the forty active members of the Philadelphia Society of Artists only fifteen have sent anything at all, and among the contributions of these very few are important enough to be more than apologies for the non-appearance of other authors.

These reservations made, however, the exhibition will be found by no means lacking in interest. The pictures from Paris, though few in number, are for the most part very good indeed, and are the more interesting as coming in many cases from artists who are comparatively unknown. This is indeed the best thing about the exhibition, that it is particularly strong in good work from the younger men, both at home and abroad. It is an admirable feature in anybody's exhibition too, and one which we are not accustomed to associate with the displays of academical institutions. What lends an additional interest to this part of the exhibition as far as local art is concerned, is the fact that the Charles Toppan prizes for works, by students of the Philadelphia Academy, which show best drawing are to be awarded now for the first time. They are two money prizes of two hundred and one hundred dollars respectively, and the recipients must have been students at the Academy for at least two consecutive years. The Mary Smith prize of one hundred dollars, for the best painting by a lady artist of Philadelphia, is also to be awarded. It was won last year by Miss Emily Sartain.

A return is made this year to the old practice of including water-colors and black-and-white drawings in the exhibition, as well as paintings in oil. With the spacious galleries of the Academy to arrange them in, it seems to be very desirable that works in these departments should be included, and for one I was surprised and very sorry to find the exhibit so small. Mr. Freer has sent a couple of good water-colors, and Mr. Pennell two or three capital etchings. There is a set of drawings for illustration by A. B. Frost, of considerable merit, and a charcoal head, by Mr. Kirkpatrick, that is more satisfactory than most of his paintings. But the little room devoted to works of this class is only half filled, and there are few besides those I have mentioned that arrest one's attention, or repay his scrutiny.

In sculpture, there are some good bronzes by the Bartletts, father and son, strong, earnest work; a study for a statue of Alexander Wilson, by Mr. Calder, of Philadelphia, and two very good busts in plaster, by Mr. George F. Stephens, a young sculptor of considerable promise, who makes, I believe, his first appearance at this exhibition.

There always has to be a place of honor, you know, and you can't help fixing your eye on it if you begin to mention particular works. On the present occasion it has been given to Mr. Bridgman, for the very brilliant piece of work which is catalogued as "A Roumanian Lady." The title is not very significant, but that does not matter, for the subject is really not a lady of anything at all, nor even a fine figure of a peasant woman of somewhere or other, seated at her spinning, before the door of her thatched cottage, as she pretends to be. No, it is nothing but a model, as much and as obviously a "property" as the distaff and the thatch, and her only mission here is to let us see how well Mr. Bridgman can render subtle values and delicate textures.

In a different vein is the "Castles in Spain" of Mr. T. Alexander Harrison, which possesses, I think, imaginative qualities of a higher order than anything in the exhibition. It was one of the successes of the last Salon, and it is perhaps not necessary to describe it; besides there is not much to describe. A ragged and not very lately-washed boy is stretched on the sand beside the sea, gazing at vacancy, absorbed in the unreflecting extravagance of his waking dream. The current of this is symbolized for us by the make-believe structure of sticks and shells which he has formed in the sand. And that is all. The execution is such that Mr. Harrison ranks with the realists in any question of truthfulness to nature, but so exquisite is the treatment that the mind refuses to dwell upon any material thing which the artist has found it necessary to paint. The solid earth and the stretching sea seem less real and less enduring than the childish imaginings of this ragged boy. Are they not so indeed? Shall not his little dream outlast them both?

As a piece of story-telling, pure and simple, I think Henry Bacon's "A Sailor's Story" is quite alone. It is painted a good deal better than the "Luck of Roaring Camp," which was shown here a year or two ago, and the dramatic power which would have redeemed a much worse picture than that, is not less marked in this. The composition is admirable. The principal gathering, of which the young reciter of adventures is the centre, and the subordinate groups, the outer rings, so to speak, of the agitation which his return has caused in the little village, are alike delightfully treated. The figures are drawn with spirit and are carefully studied, while the model has not been allowed to play the tyrant, as in Mr. Bridgman's picture, and quite as conspicuously in Mr. Eakins's "Crucifixion," which is here seen for the first time, although it has already been shown in New

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York and in Chicago. That the conception of this is hardly the most dignified or reverent one possible, I presume that we shall all agree. The one dead figure nailed to the cross fills the canvas. There is nothing else in sight. There is only a glimpse of rocky descent and the open sky at noonday. The figure is that of a blond young man, slender but not delicate or refined; weak rather than spiritual, and deluded rather than divine. I confess that to me it only seems to say, "Come away and leave him alone in the white sunshine; it was all nonsense that we have heard about the darkness and the heavens themselves being moved. It was cruel to kill him, of course, but it is done now and cannot be helped; the clamoring mob was inhuman, we know, but it was not so very blind after all; there is one less delusion in the world, at any rate." I am, however, quite ready to waive the whole question of the conception as something with which the critic has little to do. Besides, there is another side to it; what business have we to obtrude our petty "conceptions" into a scene like this. I really think the artist means to say, "Let us paint what might really have been seen on Calvary when the crowd had departed and the darkness was gone; let us paint it as simply and truthfully as we can. It will tell its own story, and enforce its own lesson." Looked at from this point of view, however, I am afraid the picture cannot be reckoned a great success; the model is oppressive; his heavy hand is felt everywhere. With the exception of the head, which is certainly very weak, from whatever standpoint it is judged, the whole upper part of the figure is painted with a good deal of power. The body does certainly seem to be dead and to hang heavily by the rigid and bloody hands. It is hideous in its uncompromising faithfulness to an ugly model, but we will not gainsay its truthfulness, which is perhaps much more beautiful than any of our little standards of beauty after all. In the lower part, however, the figure certainly fails. The strained muscles of the legs maintain the body in its position only by exertion, and the feet are purple with standing. The model has done too much, and has only defeated the purpose which he hoped to serve. Poor man, he has suffered from long posing in a most uncomfortable position, but he is not dead; there has been no violence; we are all glad of that.

Another work of Mr. Eakins's is more satisfactory. He calls it "Singing a Pathetic Song," and I think it shows him at his very best. It is a simple group, a family group, let us say. One lady stands and sings, the other sits at the piano; the old father in the background completes the harmony with his venerable 'cello. There is almost an utter absence of accessories, and no attempt at anything like prettiness; indeed everybody knows that Mr. Eakins seems rather to enjoy making his sitters look a little homelier than they really are. There is no nonsense anywhere, but plenty of downright earnest sentiment. There is nothing in the whole collection that seems quite so genuine and sincere.

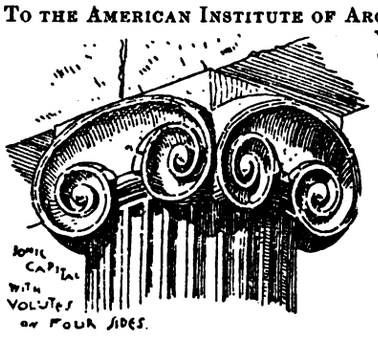
Of portraits there is an abundance certainly, but never, I think were so many bad ones got together before. Mr. Alexander's "Thurlow Weed" is strong and good, and one by Mr. Charters Williamson — quite a new name to me — has something about it that arrests and holds the observer's attention from the moment he enters the room; but with these two exceptions there is very little of interest in this department, and it would be as unprofitable as unpleasant to catalogue the infirmities.

Among the landscapes there are several very good ones — a winter piece by Bruce Crane, "A Nipping and an eager Air;" several capital things from Brittany by Burr H. Nichols and by Clifford P. Grayson; quite a brilliant, large "Venice" by Walter L. Palmer, and a good many more which I should be very glad to mention by name if it were not out of the question within the limits of this notice. I should be sorry, however, not to mention the work of one young man who makes his first appearance here, but from whose future I am confident a good deal may be expected. Mr. Chas. H. Davis of Boston sends from Paris two landscapes, "Evening" and "The Plain," which are simple and effective and are pervaded by as fine a "feeling for his business" as anything that is shown. "February in the Forest of Fontainebleau" by Mr. H. Winthrop Peirce deserves to be noticed in company with these.

L. W. MILLER.

A. I. A. — SIXTEENTH ANNUAL REPORT OF THE BOARD OF TRUSTEES.

TO THE AMERICAN INSTITUTE OF ARCHITECTS: —



YOUR Board of Trustees for the year 1881 held two meetings between the last Convention and the close of that year, and your present Board, consisting of the President, Vice-Presidents, Treasurer, and Secretaries, *ex-officio*, and of Messrs. Congdon, Littell, Cady, and Le Brun, have held so far during the current year nine meetings, quarterly, monthly, and special, making eleven in all. But one meeting, not included in this enumeration, has failed for want of a quorum. They have been held in the office of the Treasurer, while the work of the Secretary has been carried on in his own office, and has involved the writing of over one hundred and fifty letters, exclusive of permanent records, and of routine correspondence and its replicates.

The elections during the eleven months since the last Convention, embrace thirteen (13) Fellows, as against two (2) during the previous twelve-month, and 17 Associates, (as against 15 the previous twelve-month), or 30 professional members in all as against 17. The following list, as arranged in chronological order, covers the names of the new members, viz.: in the Fellowship grade, H. Edwards Ficken, T. M. Clark, Charles Crapsey, Seth Babson, James E. Wolfe, G. W. Sanders, J. Wright, Wm. Curlett, Thomas J. Welsh, Thomas Fuller, Samuel Hannaford, George W. Rapp, and C. A. Wallingford; and in the Associateship grade: C. A. Didden, Augustus Eichhorn, M. F. Bell, D. T. Atwood, O. von Nerte, H. R. Marshall, W. M. Poindexter, N. G. Starkweather, Charles M. Bartberger, Glenn Brown, H. S. Barnes, J. Morgan Slade, Douglas Smyth, Stanford White, C. J. Clarke, Fred. H. Gouge, and S. S. Bemen. Two of the Fellows and one of the Associates just enumerated were formerly members, and after the lapse of years have sought and received re-instatement; but your Board has reason to know that some of the old members who unwillingly lapsed, during the long depression in business matters, simply from inability to meet an accumulation of dues, and would still find it a hardship to liquidate them, have nevertheless, such present resources and prospects, as would justify them in seeking re-habilitation, and would be glad to do so, if assured that back dues would not be called for. Under these circumstances the Board has felt it incumbent to pass a resolution asking this Convention to authorize it to remit, at its discretion, the back dues of former members seeking re-election.

To the list of Honorary Members, one name, that of General J. D. Cox, of Cincinnati, has been added, while Mr. N. H. Hutton, of Baltimore, a former professional member, but who has for some years confined himself to the practice of civil engineering, has been elected a Corresponding Member.

No resignations from membership have occurred during the inter-Convention period; but the necrological list unhappily includes our late young Associate, Mr. J. P. Sims, of Philadelphia, who died very suddenly of heart-disease last May, while conversing with an assistant in his office, and whose merits and promise we shall doubtless presently find duly memorialized in the report of the Philadelphia Chapter. We have also lost by death four Corresponding Members, Major-General J. G. Barnard, of the Engineer Corps of the U. S. Army; Robert Briggs, A. W. Craven, and W. Milnor Roberts, all civil engineers of prominence, who have already received elsewhere the obituary memorials due to their reputation.

Although the period covered by this report—as was also the case the previous year—has witnessed a larger accession to the professional membership of the Institute than has occurred during the same space of time, since the earlier years of the organization, the Treasury is lower—owing to the greatly decreased regular assessments on members—than it has ever been before; so that the reduction of dues, unless the membership largely and rapidly increases, must still be regarded as experimental. One cheering indication for the future is, however, to be found in the rehabilitation of the long-time dormant Chapter whose hospitalities we are now enjoying; and another in the accession, which occurred on the 5th of last May, of a branch on the Pacific sea-board, transformed from the Pacific Coast Association of Architects into the San Francisco Chapter, A. I. A. It is to be hoped that this latest acquisition, planted at the Golden Gate of the Republic, may be of good augury for the coming resources and consequent influence of the Institute, and that it may be the starting point of many links which, sweeping eastward with the energy of new blood, from the farther ocean, may meet those that, originating on the Atlantic Coast, have been slowly (and with such toil and discouragement as those who have worked the most best know) forged on the westward course of gathering wealth and culture, till one unbroken chain spans the Continent, and binds together for the common good of the architectural fraternity and the public that employs it the otherwise divergent local interests and mutually destructive forces of the practice of our specialty.

The report of our Secretary for Foreign Correspondence will give us the particulars of the important and interesting discovery, by our old and esteemed Honorary and actively-Corresponding Member, the Chevalier J. da Silva, President of the Architectural and Archæological Society in Portugal, of the remains, in the Province of Estramadura, of a Roman city — a discovery believed to be altogether or quite unique in that country. Your Board voted the Chevalier thanks for his interesting information.

The Secretary has, at the request of Associate J. L. Smithmeyer, of Washington, about to visit Europe on a visit of inspection for the U. S. Government, furnished him with credentials for presentation to the Honorary Members of the Institute, and the architectural societies of Europe.

The last report of the Board of Trustees, in illustration of the "increase in the calls upon it for authoritative opinions, in contested cases naturally falling within the jurisdiction of its specialty," cited certain resolutions passed by it in the case of an issue between Associate George Keller, of Hartford, Conn., and a Committee of the Common Council, of Buffalo, N. Y., for a soldier's monument. Mr. Keller informed the Board last January that he had been partially paid, and that he was to receive in all about eight per cent on the whole cost of the structure, his claim having been for ten per cent.

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The same report contains a resolution of the Board "on an important question, raised by one of the documents of the Institute itself — the schedule of charges recommended by it." The resolution is intended to indicate the duties of an architect in reference to the supervision properly exercised by him over a building, "as distinguished from the superintendence of a clerk of the works," and was furnished to Mr. R. P. Southard, of Charleston, S. C. (afterwards and now an Associate of our body), to serve him in a lawsuit with a client, in which, as he informed the Board last March, he was successful. The discussions in the Board attending the passage of the resolution referred to, led indirectly to the expression at the last Convention of a request, "that the question of revising the schedule of charges recommended by the Institute be referred to the Board of Trustees," and accordingly it was discussed at its February meeting, and "Mr. Le Brun was appointed a sub-committee of one to present to the Board such amendments as might appear to him to be advisable." His very careful and exhaustive report on the subject, when presented to the Board was gratefully accepted, and after debate it was resolved to report progress at this Convention, and to ask that the subject be referred back to the Board for further consideration, while presenting for temporary employment the schedule now endorsed and issued by the Institute, with the following changes: The title to read, "Schedule of Charges and Professional Practice of Architects, as usual and proper, and as endorsed by the American Institute of Architects;" the words "For stores three per cent," to read "For warehouses and factories, three and one-half per cent," and the price figures, "$5,000," in the following line, to read "$10,000."

Since the last Convention two similar cases of issue between architects and clients have been referred to your Board, and one requiring immediate action, and an expression of opinion on which the architect interested would not defer to a special meeting of your Board, which your Secretary wished to call, was referred to him during the summer. In one of these cases occurring in Western New York, it is understood that no result has been reached; in another, occurring in Massachusetts, your Board

"*Resolved*, That, providing the facts are as stated, Mr. —'s claim is moderate and just, is according to the schedule of the Institute, and should be allowed."

In the third case the Secretary gave it as his opinion, to quote the substance of his letter on the subject, "that it is customary to plan and supervise a warehouse for three per cent, and that the word 'store' as used in our schedule is synonymous with 'warehouse.' The (building in question) however," — the letter went on, — "as described in the printed circular you enclose, is to be a building of complicated construction, as far as possible removed from the simple statical lines of an ordinary warehouse, and in which the inclusion of a few stores is a very unimportant matter as compared with the rest of the work. My judgment, therefore, is that for full architectural service on said building you are entitled to five per cent commission." The architects personally interested in the latter two cases have each forwarded their thanks for the assistance received from the expression of opinion remitted to them.

At the regular meeting in March, the Secretary was authorized by your Board, in view of a certain case presented to him, to procure information as to the actual emoluments of architects practising in the United States, and particularly as to the methods of remuneration employed in the case of public buildings, on the understanding that the information obtained should be subject to the future use of the Board, for publication if necessary, with respect to facts, though not with respect to names. Consequent on this action the Secretary has had, and is still having, a varied and very interesting correspondence, which, however, in its present incomplete shape is necessarily to a considerable extent confidential. Probably by the next Convention it may be expedient to lay at least its substance before the Institute, with the promise of good collective and individual results.

Many members have probably felt what a desideratum exists for a thoroughly arranged and exhaustive technical manual, suitable for the current use of the architect practising to-day in the United States. At the September meeting of your Board "the Secretary produced a letter from Mr. F. W. Vogdes, architect, of Louisville, in reference to the possible sanction of the Institute for a new edition of his price-book, 'the Architect's and Builder's Pocket Companion,' with his answer to the same expressing the opinion 'that the chief need of [Mr. Vogdes's] manual seemed [to the Secretary] to be a full and alphabetical index, and an appreciation of the different customs and terms that prevail in different sections of the Union, as regards the building and cognate trades.' It was also suggested that 'familiarity with our proceedings, and correspondence with affiliated practitioners all over the country might materially assist [him].'"

At the regular meeting in January, your Board, fearing the result of political action, brought to bear for personal profit, adopted the following minute: "The Board of Trustees, A. I. A., understand with regret that there is a movement to dispossess of his office the present Supervising Architect of the Treasury Department, and desire to express the opinion that any change in the incumbency would, in all likelihood, result unfavorably to the public interests." This unsolicited communication was forwarded to the Government officer indicated and elicited a grateful acknowledgment.

At the first meeting of the Board after your Washington Convention the following preamble and resolution were adopted:

"*Whereas* the names of the architects who have successively been employed on the National Capitol at Washington nowhere appear on the edifice, and whereas the precedents are numerous in this country and still more in Europe for honoring the creators of important and conspicuous works of art by such permanent record, therefore

"*Resolved*, That it is the sense of the Board of Trustees, A. I. A., that such omission should be supplied, and it desires the Secretary to communicate with a member of Congress, with a view to placing a tablet within the rotunda, inscribed with the names of the successive architects, with the dates relating to their periods of service."

President Walter, one of the architects of the Capitol, was not present at this meeting, but at a subsequent one in January, being present, he showed, for reasons which he stated, little favor to the proposition. It was not, however, abandoned by the Board, but the Secretary has not yet found an opportunity for moving in the matter to what he considers the best advantage, and it remains *in statu quo*.

At the regular meeting in March the Board

"*Resolved*, that the sum of $100 be taken from the Treasury of the Institute and put at interest by the Treasurer as the nucleus of a Building Fund, to be devoted to the acquisition by the Institute of a Building for its own purposes," and

Resolved, That no part of said fund or its accruements shall be withdrawn except by unanimous vote of the Board of Trustees, five being present."

At the next meeting a small additional sum was voted to pay the premium on a U. S. bond for $100, in which shape the Treasurer had invested the previous appropriation. This nucleus has just been slightly enlarged by the gift from a member of $100 with the promise of an additional hundred dollars when the fund shall have reached one thousand dollars; and the Treasurer, who first officially broached the scheme on the basis of $25, will be only too happy to forward receipts and move the thanks of the Board for much larger sums subscribed to the same fund. The costly Masonic Temple in New York City was built from a fund which was started from a subscription of one dollar. There are few large cities in Europe which do not boast a convenient building of assembly owned by the resident Society of Architects; some, as in Vienna, being of very ornate and costly description; and in this country of dominant trade, business combination, and high city rents, when the junction of stores and offices with assembly and show rooms may be made in a very few years to pay for the cost of a building and provide a current revenue, besides leaving a large part of the structure rent-free to its owners, it must certainly sometimes seem strange to themselves — as it would undoubtedly seem discreditable to the public if it were generally known — that the practioners of the art and science of building in America are destitute of a professional home, and have not where to store its books and archives without encroaching on the personal appliances of its members. The moral effect on the public and the professional advantages to themselves that would accrue from the display of their works in, and the advertising of themselves from, their own quarters can hardly be overrated.

Respectfully submitted for the Board of Trustees by

A. J. Bloor, Sec'y.

October 24, 1882.

EXTRACTS FROM THE CHAPTER REPORTS.

FROM THE CINCINNATI CHAPTER.

THE Cincinnati Chapter of the American Institute of Architects begs leave to report that during the past year they have again come within the fold of the Institute, fully complying with all the requirements of the By-Laws, and like the Prodigal Son, we hope and expect that the fatted calf will be prepared in honor of the event.

FROM THE RHODE ISLAND CHAPTER.

Little formal business has been brought before the Chapter, while the increase of professional work, following upon the prosperity which has everywhere been apparent in commercial and business centres, has prevented us from entering upon any united efforts towards reforming abuses which still surround and permeate all building interests. We may flatter ourselves, however, that while as a Chapter we have been apparently idle, individually we have all reaped benefits from our organization and connection with the Institute. The bond of union among us is strong, and the general public in Rhode Island is gradually recognizing the fact that there is something more than mere longing for display in our assumption of the initials of Institute membership.

FROM THE BALTIMORE CHAPTER.

The attempt made by the Chapter to provide a building-law for the city of Baltimore has failed. After having the matter brought before him by the Chapter, the late Mayor, by ordinance of the City Council, appointed a commission composed of one lawyer, three architects, and two builders to draft a suitable law. This committee, after a good deal of labor, having as a guide the building-laws of other cities, presented such a law as they thought would be beneficial to the citizens of Baltimore, but our City Fathers have allowed it to sleep quietly, with no hope of its passage.

FROM THE SAN FRANCISCO CHAPTER.

As you are doubtless aware the "San Francisco Chapter" is a resolvent of the "Pacific Coast Association of Architects" inaugurated in May of 1881, the change from the same to our present position as a Chapter, by kind recognition of your body, having been

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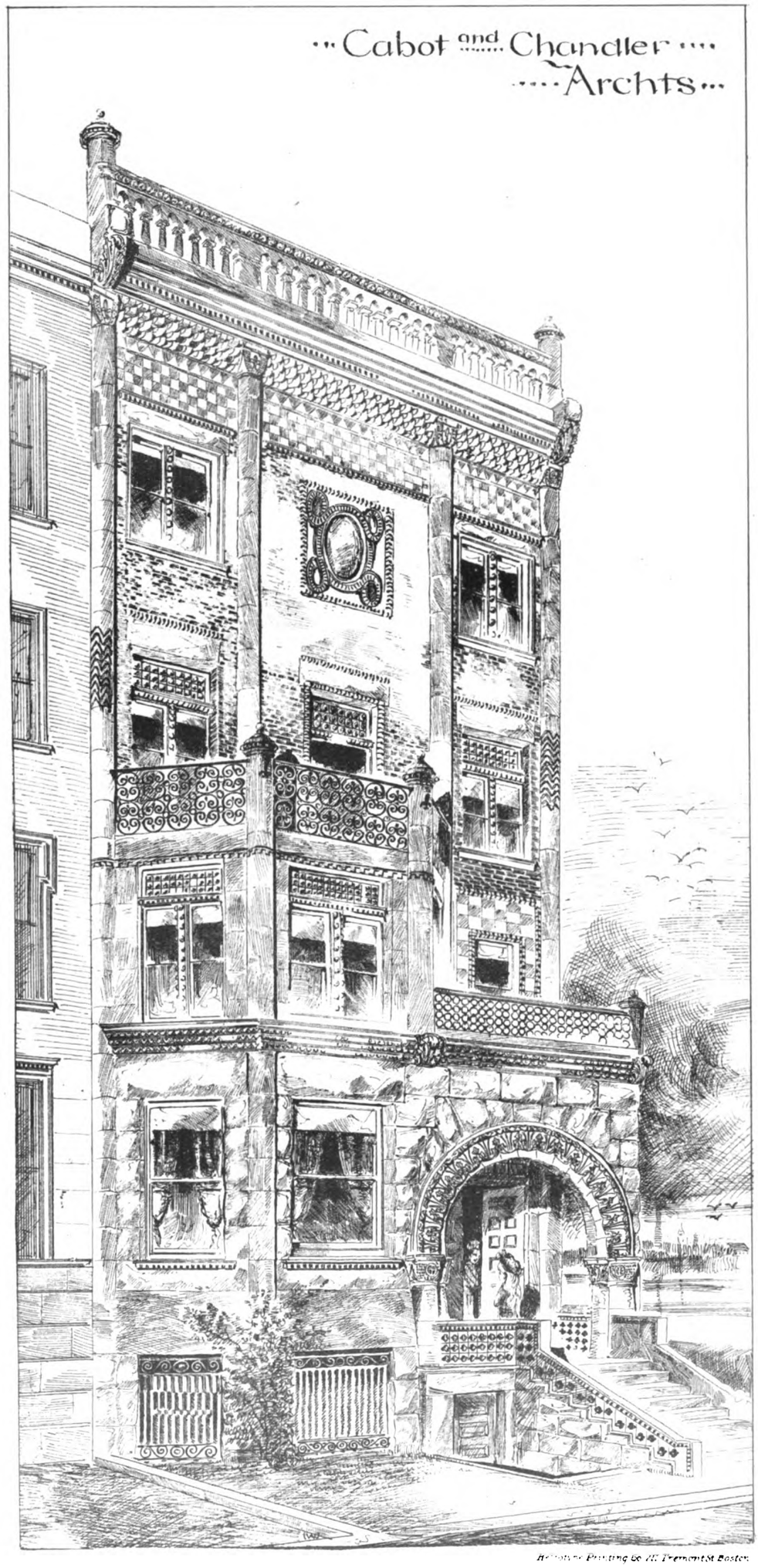

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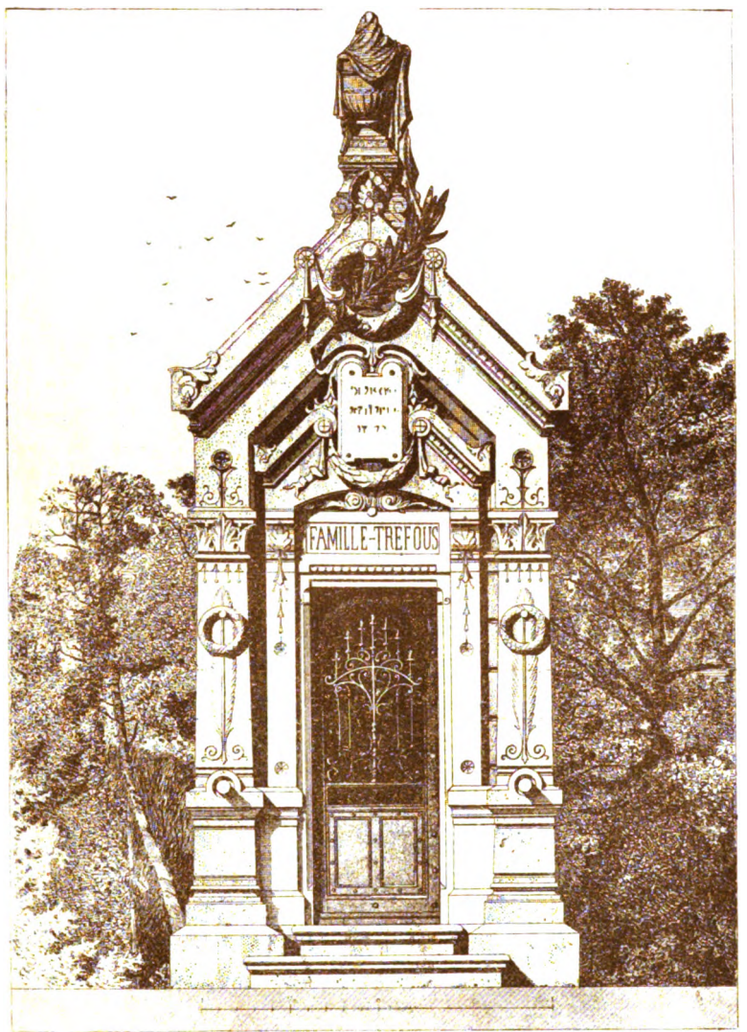
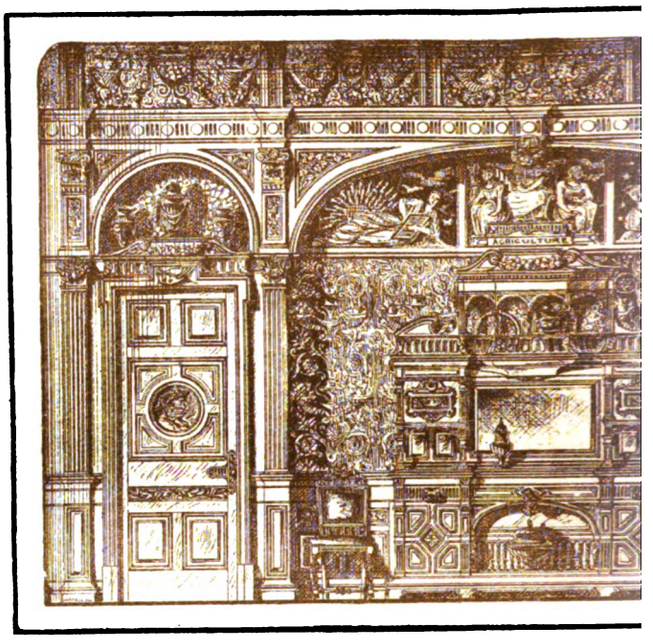
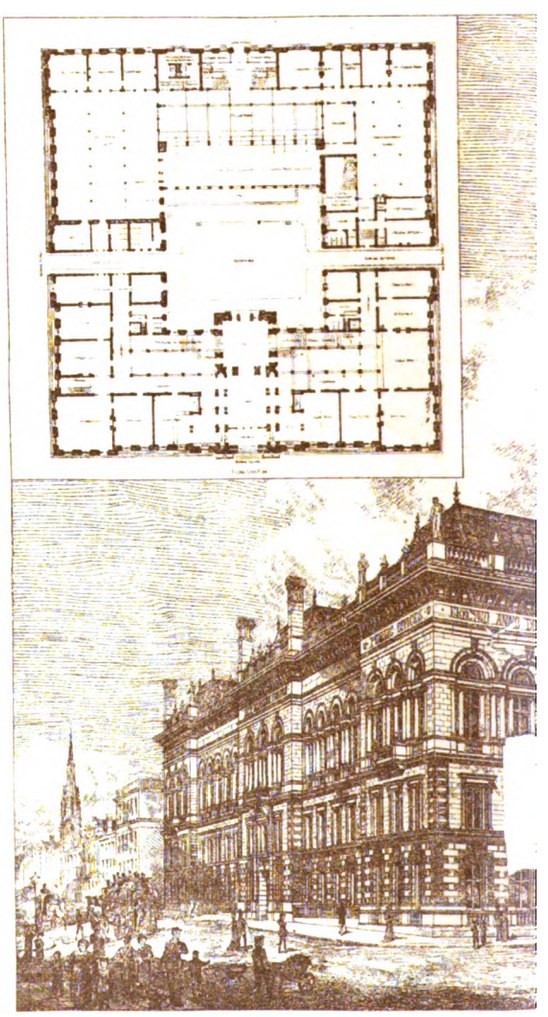


Moniteur des Architectes



FIRST PRIZE DESIGN.—Side of Dining Room, by W



AN OLD HOUSE AT CANTERBURY

THE BUILDING NEWS.

DESIGN

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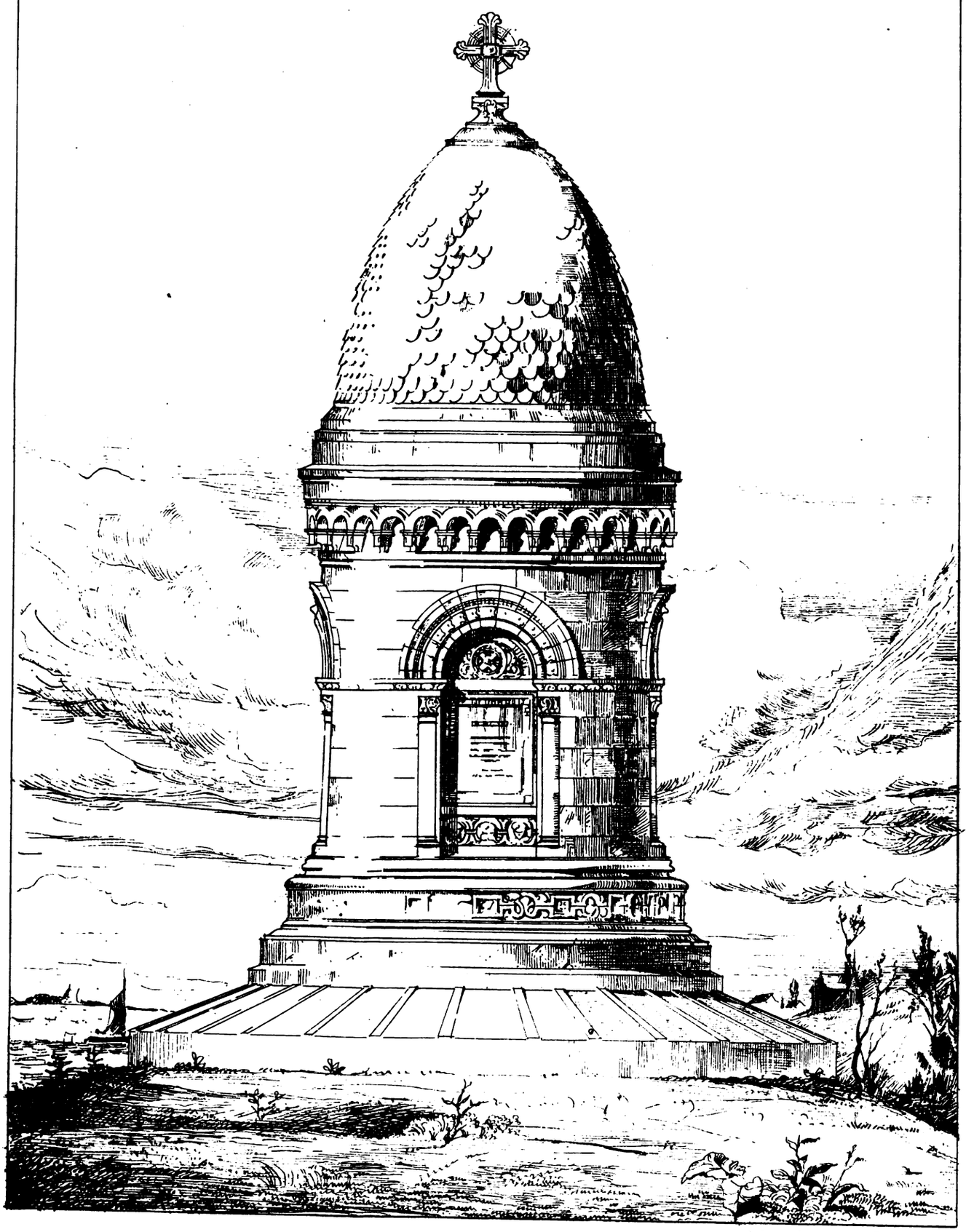
Monument to be erected in Woodlawn Cemetery.

Thos. Hastings Arch.



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ROMAN AQUEDUCT, SEGOVIA, SPAIN.

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made in May of the present year, and the mere realization of such a recognition has already been fruitful of an increased interest on the part of our members; such interest being manifested, we are happy in stating, not for personal aggrandizement, but for the maintenance of the status of the profession as an art, the interchange of ideas upon a thorough social basis, and the display of the utmost good fellowship, with the assurance that concerted action is the only road to successful issue, feeling that as the "star of empire" is westward, we, here upon the Pacific slope, become the recipients of the advancing tide of progression having its birth in the East.

As the heretofore comparative isolation of the "Pacific Coast," the matter of climate, conditions of the people, and the phases of social life, have been the means of engendering certain types of originality, as displayed in our artistic and mechanical productions, our architectural groove will admit of many deviations, and with a unanimity of action with yourselves, we hope by such procedure to essay productions worthy of mutual rank and consideration.

THE ILLUSTRATIONS.

THE ROMAN AQUEDUCT AT SEGOVIA, SPAIN.

[*Chromo-lithograph.*]

SOME score or so of years ago an amateur of noble blood,—judging by his name a Russian or a Pole, Prince Mestchersky, — travelled through Spain and northern Africa, having in his train one or more excellent water-colorists to make sketches of such architectural or other subjects as appealed most strongly to his individual taste. Whether or not the object of his travels was the future publication of these sketches, the fact remains that on his return home a certain number of them were issued as chromo-lithographs—and the best of their class we have ever seen. One of these, the Roman Aqueduct at Segovia, we have reproduced at about one-third the size of the original. As some of our subscribers may be tempted to endeavor to obtain some of the original prints, we ought to advise them that, as we have probably used very many fewer stones for our reproduction, much of the rich sobriety of the original has been undeniably lost.

DESIGN FOR GLASGOW MUNICIPAL BUILDINGS. MESSRS. WORTHINGTON & ELGOOD, ARCHITECTS.

[From the *Architect.*]

This design was one of the premiated designs selected in the final competition, and is based mainly on the city architect's plan, it being understood that the arrangements and accommodation required had been under his consideration for several years, in conjunction with the other chief officials. The distinguished feature of this design is the arrangement of the saloons to serve as picture and sculpture galleries; one of the illustrations now given shows how this was proposed to be effected, also the internal appearance of the principal entrance and council chamber. Entrances are provided in John Street for the gas and water departments, and service of banqueting-hall, etc.; in the quadrangle for public works and Dean of Guild, as well as minor entrances to the other departments. Considerable dignity is given to the main entrance by the arrangement adopted of a circular vault, the tower on each floor serving as a means of communication from each side of building, with an open well and balcony looking into the entrance loggia. The warming and ventilation, sanitary arrangements, etc., were all worked out by the authors, without external aid, having had considerable experience in similar matters on other large public buildings; and the lavatories and water-closets were all placed next the external walls, with ample provision for air-supply, ventilation, flushing, and disconnection from drains. Separate smoke and ventilation shafts are provided for the various departments, under proper control in the basement, supplemented by hot-water pipes for the larger rooms, corridors, staircases, etc.; and the tower is utilized for extraction of vitiated air, also for storage of water, clock and chimes, alarm bell, and electric-light. Two lifts for passengers are provided for access to the principal rooms and saloons, and smaller hoists for coals and service in convenient positions, with tramways in basement all round; the construction of walls, floors, and roofs being fire-proof throughout.

THE CERTOSA, PAVIA, ITALY.

[From the *Builder.*]

DESIGN FOR A STAINED-GLASS WINDOW FOR TRINITY CHURCH, BOSTON, MASS. DESIGNED BY MR. BURNE JONES.

[From the *British Architect.*]

PRIZE DESIGN FOR THE SIDE OF A DINING-ROOM.

[From the *Cabinet Maker and Art Furnisher.*]

OLD HOUSE AT CANTERBURY, ENGLAND.

[From the *Building News.*]

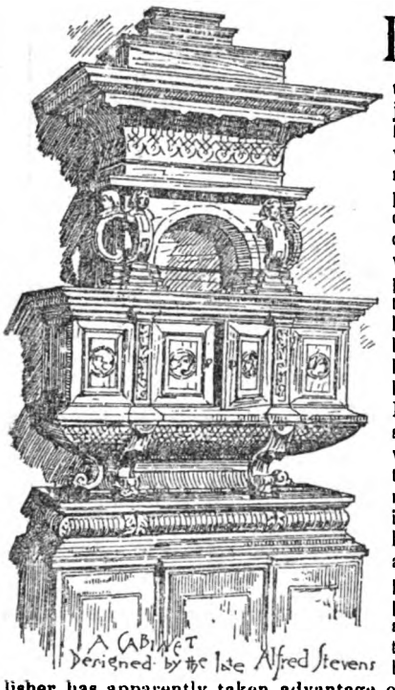
TOMB.

[From *Le Moniteur des Architectes.*]

MONUMENT TO BE ERECTED AT WOODLAWN CEMETERY, NEW YORK, N. Y. MR. THOMAS HASTINGS, ARCHITECT, NEW YORK.

DESIGN FOR A HOUSE FOR MR. ——. MESSRS. CABOT & CHANDLER, ARCHITECTS, BOSTON, MASS.

NEW JOURNALS.



DURING the past few years we have witnessed the advent of many trade and *soi-disants* art-journals and have found few among them that were well-developed infants: most of them seeming to be prematurely born, and requiring the most careful cosseting to enable them to weather that most critical period of their existence, the first year. Every rule has its exception, however, but in spite of this we have been rather startled by the birth of a journal which, Minerva-like, presents itself to the world full-clad, with all the panoply of editorial staff, business-like management and corps of illustrators. So far as we know, this is a unique example of journalistic enterprise, and has evidently profited to the fullest by an unknown period of gestation, which we hope has been painless. The publisher has apparently taken advantage of his long connection with serial publications — of a wholly different character, however — and has had the wisdom not to allow his editor to begin his career before adequate preparation had been made for his support. The reality of the assistance he has secured is sufficiently evidenced by the statements made in the first issue of the *Decorator and Furnisher*,[1] by its contents, and by the array of contributors announced. The journal promises to be an exceptionally good and successful one, and like most good things is sure to create its own demand. To be sure, we could hardly do less than to speak kindly of a journal which pays us the compliment of editorially placing the *American Architect* at the head of the short list of journals which it declares most completely meets its own idea of what a "trade paper" should be. In "make-up" and general scope the new journal more nearly approaches the excellent *Art Amateur* than any other journal we know, but its aims are evidently less purely artistic; for the latter is in no sense a trade paper, while the new-comer as distinctly is. We have but little inclination to make any derogatory remarks, but we cannot help repining that the new journal has an exterior which tends to scale it down below the rank which its interior merits should secure for it. We could hardly blame an intending subscriber for thinking that if the design of the cover marked the height of the publication's aspirations art-ward, it would be hardly worth while to expend money on it. Fortunately many a rough shell encloses a palatable kernel, and though this elaborate cover can hardly be called rough, it certainly encloses things better than itself. It also serves as an illustration of a caution which we offer for the consideration of the editor. It is evidently a mere design, and not a record of executed work, and it is in the matter of accepting and rejecting mere designs — sketchy ideas, phantasies — that the editor will find one of his most useful occupations, and one which it will require some firmness as well as delicacy of treatment to discharge satisfactorily. Designs, as such, fall very well into the same category with patents: they may be ingenious, but few of them are practicable, and still fewer could stand the test of use and prove profitable. We do not advocate the publication of none but executed designs, but we do urge that in the treatment of the multitude of designs that will be offered, the editor should keep in mind the whist-player's rule, "when in doubt, play trumps," and when he has a doubt as to the absolute merit of a design, trump it with a refusal. The journal will gain in the long run, though it may lose a host of dubious supporters. With executed work a less rigid rule may be followed, on the plea that all historical records are of use.

A SERIAL publication, even though it be a monthly, which has apparently no editor, no editorial department, and no editorial views or intentions is surely something of a novelty, though the innovation is not without distinct advantages. It saves an editor's salary to the publishers, and the bodily comfort and peace of mind of some fortunate individual who might otherwise have the mischance to occupy the editorial chair. It does not burden the publication with the necessity of maintaining a policy or adhering to views already expressed. It throws on the publisher the immediate responsibility for all that the journal contains, on whom, of course, pecuniary responsibility must rest finally, even when the journal's views are enounced by an editor, who probably expresses them without consultation with his employer; and finally, it probably tends to waken in

[1] *The Decorator and Furnisher*, issued on the third Saturday of each month. New York: E. W. Bullinger.

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its contributors a greater interest in their work and a more active support, for they must feel that if their own zeal slackens the journal will pine for want of nourishment.

It is possible, of course, that "*Building*"[1] has an editor, but if so, he is a man of unusual modesty and is not willing to make the public partners in his views and intentions, but is content to produce his first number without the attendant trumpetings that usually announce the presence of the omniscient "We." The result is that this first number looks unusually business-like and seems to promise that its subscribers will be well served.

Of its general character it may be said that it apparently aims to occupy the field lying between that which we attempt to cultivate and those which are now in the possession of the *Builder and Woodworker* and *Carpentry and Building*. The whole area is so vast that even with the assistance of the *California Architect, Wood and Iron*, the *Manufacturer and Builder* and the *Southern Manufacturer and Builder* it cannot be said to be yet wholly occupied, so that knowing and appreciating the energy and perspicacity of its publisher we can hardly doubt that it will earn its livelihood and prove a success.

It is a pleasure to encounter a new journal which is made up with an eye to appearances, and the tastes and predilections of its subscribers for good book-making, — for most publishers intend that their journals shall have more than an ephemeral being, and in their "make-up" keep an eye on the appearance that the bound volume will have at the end of the year. Trade papers are rarely issued in such creditable form as this of the *Sanitary News*,[2] which in every respect compares most favorably with the only competitor in its specialty that is now published in this country — leaving out of the question such monthly publications as interest themselves with matters of sanitation.

There cannot be, for the good of the public, too many journals of a high grade, making a specialty of matters of public health, and though, of course, a survival of the fittest is to be expected, we see every promise in the two numbers of this journal which have reached us that it will be found amongst those which have the best right to a long and useful career.

COTTAGE-HOSPITALS.

Dr. L. W. BAKER who has had much to do with the establishment of a cottage-hospital at Baldwinsville, Mass., writes in the Boston *Herald* of the disadvantages of the present hospital system and the benefits which have been proved to follow the adoption of the cottage system, as follows:—

The placing of the sick under the best possible conditions for speedy recovery is a problem which has ever engaged the warm sympathy and earnest efforts of all interested in the welfare of suffering humanity. Stately buildings of the most enduring character, great monuments of benevolence, have been erected, wherein the sick and suffering might find the means of speedy restoration to life and health. Partly for economy of administration, and partly from mistaken ideas of hospital management, this method of benevolence has taken the form of large, many-storied buildings, in which the care of the sick can be economized under a single roof, and the wants of large numbers met by a simple organization of physicians, nurses and attendants. Has this economy of administration been attended with a corresponding economy of life? Some years ago Dr. Simpson, of Edinburgh, took up the subject of "Hospitalism," and fixing upon the amputation of the limbs as affording the best standard of comparison, he collected a great number of these cases from town and country, from hospitals of all sizes and grades, and from surgeons not attached to the hospitals in Scotland and England. As the result of his labors, he showed that the ratio of mortality in the smaller provincial hospitals was less than half as great as in the large London hospitals. Out of 2,089 amputations in hospital practice, 855 die; out of 2098 amputations in country practice, 226 die; of amputations performed in hospitals of from 300 to 600 beds, 1 in 2½ die; in hospitals of from 100 to 300 beds, 1 in 4 die; in hospitals from 25 to 100 beds, 1 in 5½ die; in cottage-hospitals under 25 beds, 1 in 7 die, and in isolated rooms in country practice 1 in 9 die, showing that, as the number collected under a single roof diminishes, the rate of mortality also decreases.

In 1869 Dr. Kennedy, ex-master of the Dublin Lying-in Hospital, proved from the hospital records that the deaths in that institution had been, to the whole number of patients received, one in 72 for the whole period of its existence of more than a century, during which time it has received 200,000 patients. In some years this rate rose to one in 30, once to one in 19, and once to one in 14, while the death rates from all the accidents of child-birth, in a series of years, for the whole population of England and Wales, had been one in 223; of Scotland, one in 225, and of London, one in 229. In a paper on "Hospitals," published in 1874 by the Massachusetts State Board of Health, Dr. Derby, of Boston, calls attention to the foregoing, and also furnishes much valuable additional information on this subject. From tables compiled by Mr. H. C. Burdett, of England, in his work on "Cottage-Hospitals," we learn that, while the average rate of mortality in the general and special hospitals of London is 10.21 per cent, the death rate in forty cottage-hospitals having an average capacity of eight beds each, is only 5.4 per cent, or less than half the rate of the large metropolitan institutions. These observers have demonstrated that, other things being equal, the ratio of mortality is proportional to the size of the hospital or the aggregation of the sick in one establishment. Dr. Kennedy insisted that the origin of this mortality was in the hospital itself, arising chiefly from the pollution of the atmosphere of the building. The wards are occupied continuously day and night, and the air is being constantly contaminated, not only with the usual emanations from the skin and breath, but the presence of suppurating surfaces, and excretory discharges often add largely to its poisonous character. Unless this pernicious atmosphere can be effectually purified, its effect upon those compelled to breathe it day after day cannot be otherwise than injurious. In his remarks upon the report on Hospital Hygiene in Great Britain (made to the government by Dr. Bristol and Mr. Holmes,) the medical officer of the Privy Council, Mr. Simon, uses the following language, in relation to the fouling of the air by exhalations from the persons of the sick: "In such exhalations are embodied the most terrible powers of disease, the spreading flames, as it were, of some infections, and the explosive fuel of others, and any air in which they are let accumulate, soon becomes a very atmosphere of death. Against this danger ventilation is the one possible safeguard—ventilation which, with continuous current, shall always be bearing away, as rapidly as evolved, every volatile taint which rises from the sick, so that for hospital hygiene, ventilation requires pre-eminent regard. And, if ever the phrase 'well ventilated' may be (though it never ought to be) at all indulgently construed, in respect of a common dwelling-house, it must never, in respect of a hospital, be construed but with the utmost conceivable strictness." The value of an ample supply of fresh air, for the cure of disease as well as for the preservation of health, is now established beyond question. It is, in truth, nature's great restorative. Says Sir James Paget: "Of all the remedies which I have seen used, or seen in use, I can find but one thing I can call remedial for the whole disease pyæmia, and that is a profuse supply of fresh air." During our late civil war, an ample opportunity was given to demonstrate the truth of this remark. Hastily constructed buildings of various kinds, churches, factories, private dwellings, etc., were all used for the care of the sick and wounded, and it was found, as the result of a most varied experience, that small, detached, one-story buildings, so situated as at all times to be freely exposed to air and sunlight, furnished the best conditions for rapid recovery. "Never before," says Dr. Derby, "in the history of great wars, has been found such immunity from erysipelas, surgical fever and kindred affections, to which all great hospitals are liable, as in these simple constructions. The chance of recovery," he continues, "to both sick and wounded, is better in the rudest barracks, to which the air has perfectly free access, or in tents, than in the most elaborate and completely appointed hospitals of great cities, in which the plans for supplying air are artificial." From the foregoing reliable testimony it would seem that, to reduce to a minimum the dangers arising from the presence of a poisonous hospital-atmosphere, it is necessary to substitute a series of one-story detached pavilions or cottages, having a central management, and so situated as to allow the freest possible exposure to the air and sunlight, for the large, many-storied buildings in which, one and all, the most elaborately constructed machinery for artificial ventilation has proved a failure. In these cottages but few patients can be accommodated at one time, and the evils arising from the aggregation of the sick, will, in a great measure, be avoided, while the means of ample ventilation will be made more simple and efficient. A larger ground-space will, of course, be necessary, and the cost of administration will doubtless be more than in the large hospital building, yet, at the same time, the cost of construction will be less. But as Dr. Derby remarks: "This is not a mere question of cost, not one of ordinary economy, but of economy of life, and it cannot be put aside with the usual arguments of thrift." Our large cities are now, generally, well supplied with hospital accommodations, and, while the substitution of small detached cottages for the massive piles of brick and stone is desirable, and will be a great step in the reform of hospitals, it is to be remembered, in addition, that our smaller cities and larger towns and villages, with but few exceptions, are entirely unprovided for in this respect. For such places, the system of cottage hospitals, which has proved so successful in England, seems peculiarly well adapted. In that country it has been found that cheap wooden buildings, under the care of the neighboring physician, assisted in the management by committees of ladies, provide admirable conditions for the care and recovery of the sick, at the same time furnishing a pleasant, home-like retreat for a class of patients who otherwise must be treated in their homes or boarding-places, in many cases under the most disadvantageous circumstances, distance from the large hospitals or the nature of the injury or sickness precluding removal. About 200 of these small hospitals are now in successful operation in England, varying in their capacity from two or three beds to thirty, the average number being about seven or eight beds. They have there served an admirable

[1] *Building:* An Architectural Monthly. Published the middle of each month. New York: W. T. Comstock.
[2] The *Sanitary News*, published semi-monthly. Chicago: G. P. Brown.

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purpose in the small cities and towns previously destitute of hospital accommodations. The rate of mortality in them is in striking contrast with that of the large metropolitan institutions, as shown by Mr. Burdett's tables. The smaller number of patients under one roof, and the more perfect ventilation possible in these small buildings are important factors in the production of this result. . . .

The yearly expenditure in twenty cottage-hospitals of the average capacity of eight beds each, taken at random from Mr. Burdett's tables, is not far from $1,300 in each institution. It is more difficult to ascertain their cost of construction, as some of the hospitals are remodelled dwelling-houses, others are rented, while some are partially or wholly provided by the generosity of individuals.

The average cost of twelve cottages of about eight beds is not far from $5,000 each. The sources from which these institutions derive their income are chiefly from annual subscriptions, donations, collections in churches, and from the payments of patients. . . .

These, in brief, are the chief characteristics of the English cottage-hospital system. Its simplicity, the home-like surroundings, and its ready adaptability to the needs of country life have won for it a warm place in the regard of the English people. Are there any serious reasons preventing its more general use in this country? One bed for every 1,000 inhabitants in the rural districts, with a somewhat larger proportion in manufacturing districts, is the standard laid down by the best English authorities. With us here few towns of 10,000 inhabitants or less have any hospital accommodations whatever. In Massachusetts, for example, according to Dr. Adams, while Boston possesses 15 hospitals, with accommodations for over 1,000 patients, there are in the rest of the State, exclusive of those for the insane, and those belonging to the naval and marine service, but 10 hospitals, with an aggregate of about 240 beds. All of these are in cities or large towns of from 12,000 to 50,000 inhabitants, scarcely any of them having that decidedly rural character which belongs to the English cottage-hospitals, many of which are located in very small villages. We are not aware that other States are better provided for in this respect than Massachusetts. The board of health of that State recently sent circulars of inquiry to its correspondents in every town and city of 10,000 inhabitants and upward in the State, and in every instance, where no hospital existed, the correspondent stated that, in his opinion, such an institution was needed. Cottage-hospitals established in our large manufacturing towns will be of the greatest benefit to the employés, many of whom are without friends in the town, and live in boarding-places, in which it would be impossible to provide in time of sickness that necessary care and attention which could be so easily obtained in the cottage-hospital, and for which many would be willing to pay a small weekly sum while there. A recent number of the *British Medical Journal* remarks, editorially, on this point: "The advantages of these cottage-hospitals are not extended to the poor only, but they may be made to contain rooms for people who, when sickness comes to them in boarding-places, and in crowded homes, cannot have the care and quiet they need, and would prefer paying a moderate sum per week where they will have medical treatment and nursing, and all the best appliances for a speedy recovery." Every physician practising among mill operatives knows how utterly unsuitable are their boarding-places for the care of those so unfortunate as to be sick in them. It is very seldom that there is the slightest provision made for the care of the sick. How much greater are the chances of recovery if, when the individual is sick or injured, he can be removed at once to the quietness of the village hospital, where all the resources of the institution are at his command, under the direction of the physician of his own choice. At the same time the beneficial effect of the home-like atmosphere, which should always be present in these small hospitals, is by no means to be lost sight of.

In 1875 the "House of Mercy" was established at Pittsfield, Mass., as a cottage-hospital, after the English plan, and has since continued in successful operation. From the paper of its medical director, Dr. J. F. A. Adams, we learn that the entire management is in the hands of ladies from the various churches of the town, who constitute the board of control. They at first rented a building for hospital purposes, having a capacity of eight beds. This was occupied for three years, when a new hospital for thirteen beds was erected, which, including steam-apparatus and other extras, together with the lot, cost about $9,500. The working force of the hospital has consisted of a matron and a woman in the kitchen, assisted by such help as the convalescents could give, additional nurses being employed when necessary. The physicians of the town have attended in rotation, but paying patients are at liberty to select their own physician. The total expenses of the house, including rent, have averaged about $120 a month. The success of this institution would seem to indicate that there is no insurmountable obstacle to the establishment of similar hospitals in all our larger towns. Certainly the benefit to be derived from them by a class now deprived of hospital advantages would be incalculable.

It is also very desirable and necessary that cottage-hospitals should be established in healthy country towns and villages for sick children, especially for those suffering with the more chronic diseases. These cottages will by no means replace the "summer sanitarium," but will provide small hospital homes throughout the year, where sick children from the city, or elsewhere, can receive medical and surgical treatment, together with all those advantages so essential to the well-being of childhood which country life affords. With this object in view, a movement to inaugurate the English system of country hospital cottages, in behalf of children suffering from chronic and other diseases, and to be in operation winters as well as summers, was initiated a few months since at Baldwinsville, Mass. . . . The necessary buildings for a children's cottage-hospital, having a capacity of 25 beds, have been erected. The estimated annual expense per bed is about $100, and it is hoped that benevolent friends of poor children will provide the means for furnishing and supporting the beds in permanency. . . .

Through the efforts of Mr. J. W. Coolidge of Baldwinsville, a similar institution has also been established in Chicago, known as the Betsey Moody Cottage-Hospital Association.

WATER-PROOFING SOLUTIONS.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—Can you inform us of any suitable paint, or other preparation, that may be applied to a porous sandstone, (used as coping to a brick wall) that will render it water-proof, so as to prevent injury from moisture to wall below. Yours, etc.,

WYATT & SPERRY.

[WE believe that the silicate paint sold by Howard Fleming, 23 Liberty Street, New York, would give the desired protection.—EDS. AMERICAN ARCHITECT.]

THE EFFLORESCENCE ON BRICK-WORK.

ST. LOUIS, November 14, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Several inquiries have appeared recently in the *American Architect* concerning the white incrustation which often shows itself after rain on the face of brick walls in exposed situations. New buildings are especially subject to it. No care nor skill in the selection of the materials, nor in their laying has availed to protect the finest buildings from disfigurement by these unsightly coatings. The difficulty is not confined to any particular section of the country, but is encountered apparently wherever coal, especially bituminous coal, is used for fuel. The term "saltpetring" is sometimes erroneously applied to it, and supposing it to come from the mortar, the addition of oil to the latter has been recommended as a remedy.

Some years ago Mr. William Trautwine, of Philadelphia, analyzed these incrustations, and found them to consist chiefly of sulphate of magnesia (Epsom salts), a substance which is very soluble in water, and which tends peculiarly to efflorescence on drying. A very small portion of it thus covers a large surface. He found this salt existing partly in the bricks and to a less degree in the mortar also, and he ascribed it chiefly to the action of the sulphurous acid generated in the combustion of bituminous coal containing iron pyrites (sulphide of iron) on the magnesia in the clay and in the lime.

It is not due to the weather nor to fumes in the atmosphere alone, nor chiefly, for in that case the oldest buildings would be most affected, whereas this appears chiefly on new work. A new stock brick which had never been used was immersed in water and on drying showed the white incrustation. The same coating was found on bricks piled up in suburban brick-yards where the air was comparatively pure, and it was even found on some bricks that were still in the kiln.

Analysis of the brick clays used in these yards showed, besides the clay, varying proportions of magnesia, lime, and iron, supposed to exist as silicates. Analyses of bricks made from these clays showed equal proportions of magnesia and lime in the form of sulphates. The coal used for fuel in burning these bricks was known to contain iron pyrites, from which in combustion sulphurous-acid gas would be generated. These facts would appear to account for the presence of the efflorescent substance in the bricks, unless it could be shown that bricks burned with wood or coke fuel had the same. So far as known such bricks are believed to be free from it.

One remedy for the evil would, therefore, be to use only wood fuel in burning those bricks which are intended for fronts, especially stock bricks, also for exterior terra-cotta work, which should be most carefully protected from disfigurement.

Concerning the mortar it is well known that a great deal of the limestone burned for lime contains magnesia, whence it exists in the lime, and therefore in the mortar. If wood were used for burning the lime the magnesia would remain unchanged until subject to sulphurous vapors in the atmosphere, and probably very little annoyance would be experienced from the efflorescence, although there are sometimes white streaks in stone-work which are due to the mortar. In such cases the remedy would be either to secure lime from a pure limestone free from magnesia, or to use Portland cement instead of lime-mortar.

Mr. Trautwine used cement for this purpose successfully in laying certain basement walls in damp places, where stones laid with lime-mortar had been affected with the incrustations. He also substituted hydraulic cement for lime-mortar in the inside joints of a room whose painted walls had been disfigured by the efflorescence. After repainting the walls remained unaffected.

Not all cements would answer for this purpose. Rosendale cement is said to contain magnesia, with soda and potassa, and a double annoyance might arise from the sulphate of magnesia, and from the carbonates of the two latter ingredients, which are said to produce stains also. The English Portland cement is supposed to be free from these foreign substances.

For buildings already erected there is generally no remedy but to wait. The coating is soluble and is washed off by the rains, and un-

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less the bricks are especially charged with magnesia it will in time cease to appear.

Those who have access to the *Journal of the Franklin Institute* will find a full account of Mr. Trautwine's investigation in the number for April, 1878, from which the above information is chiefly taken. It was also re-printed in the *Scientific American Supplement*, No. 123. Very respectfully, C. E. Illsley.

AMERICAN ARCHITECT COMPETITION.

To the Editors of the American Architect:—

Gentlemen,—Will you be kind enough to inform me whether the competition plans mentioned in the *American Architect* of this week are intended for a *city* or a *country* dwelling.

An early reply is most respectfully requested.

Yours, etc. Student.

[In preparing the programme we had in mind a country or suburban house, but we have, however, no objection to receiving designs for city houses as well.—Eds. American Architect.]

NOTES AND CLIPPINGS.

Temple of Dambula, Ceylon.—It is carved entirely out of stone, and there are seven caves hollowed out of the rock, which are reached by a long flight of stairs roughly hewn up the side of it. These caves are grotesquely painted with the chief incidents of the history of Ceylon. In the first one there is a statue of Buddha, reposing full length, which is sixty feet long and all carved out of one block of stone. Before it on a table are placed offerings of flowers, candles, camphor, incense, etc. In the other caves there are immense figures of the ancient Kinks; they are larger than life-size and are painted in the most varied shades of yellow, slashed with red and green. Their faces have much the same features as are represented on wooden Dutch dolls, and have about as much expression. The walls and ceilings are decorated with rough paintings representing battles, tournaments, elephant hunts, and religious processions. Portions of these rooms were curtained off, and when we asked the reason, the old priest who was our cicerone informed us that "they were very sacred statues," but did not offer to make us acquainted with them. When we left the temple he locked the door after us with a massive silver key, which must have been at least two pounds in weight. There were curious-looking rooms, with windows with gratings, at one end of the caves, which our venerable guide explained to us had been used as prison cells for State prisoners, with so many shakes of his head that we imagined it fared ill with the poor wretches. At leaving, we offered the old priest a sanctossim (tip); but he shook his head and said he could not take anything, but we might make it as an offering to Buddha, and pointed up the hill again, but as it was a good half-mile up, ending with a severe flight of steps to the temple, we declined to do so, but settled the question by telling him to make the offer next time he went up, which arrangement seemed to meet with his views as well as it did with ours.—*Tinsley's Magazine.*

Ivy Lawns.—Ivy lawns are known to but few amongst the many who are interested in garden economy. They consist, as the name implies, of ivy only, and they offer some peculiar advantages in cases where grass lawns are apt to occasion more trouble than they are worth. An ivy lawn may be well made in one season, and if the primary operation of planting be properly performed, the lawn will make itself; it will want no cutting, no sweeping, no watering, no protection from the birds that eat the grass-seeds to-day and to-morrow scratch up the tender plants, as though it was their mission to make grass lawns impossible. And when made, being, as it were, self-made, an ivy lawn will take care of itself for any number of years; but if in need of repair or trimming, the knife, the shears, or the spade may be used with good effect by unskilful hands, and with the least imaginable cost of time, for it is not an easy thing to kill, or even to seriously injure, a lawn consisting of ivies solely. Such lawns are unfit for games, and indeed should not be trodden on. They will not, therefore, supersede grass in a country garden, which perhaps is a matter for gratulation; but they will give us the most delightful breadths of verdure in thousands of places where grass is more plague than profit, and, at the very best, tends rather to disgrace than adorn the position. In town gardens generally, where small patches of ill-kept grass tell us but too plainly that a garden is not necessarily an advantage, the ivy lawn would make all the difference between a too evident failure and a complete success. So again in spots shaded by trees, where usually we see bare earth, and it is confidently said that nothing will grow, a surfacing of ivy may be as surely secured as the shade that renders grass impossible. And while with grass for a lawn we have but little choice as to color, for the good lawn grasses are all green, with ivy we may have a great variety of colors, for there are ivies with creamy-tinted leaves and leaves splashed with gold-yellow, as well as dark-green leaves and light-green leaves After observations and experiments extending over many years, however, we have concluded that the very best of all known ivies for the purpose is the one known as "Hibbard's Emerald," for it is literally always growing, and travels fast and far, and the color of its fresh glossy leafage is a rich blue-tinted green, suggestive of the gem from which it takes its second name. It is, in truth, a delicious ivy at all seasons; it is the first to begin growing in spring and the last to cease growing in autumn, and, while it spreads freely and forms a close felt of rich herbage on the ground, it will climb and cling wherever it touches a perpendicular surface, and thus, without being directed, it will quickly clothe walls and pillars and trees with its ever-fresh and lovely leafage. But the well-known Irish ivy is a valuable carpeting-plant, and is at command everywhere for the purpose.—*Gardener's Magazine.*

How some old Walls in Rome were Made.—On the west side of the Piazza Vittorio Emmanuele, where large houses are being built by Signor Marotti & Co., a peculiar wall has been found. It gave us some two hundred pieces of marble bodies. As far as I can judge, they belong to four statues, but a great many fragments have not yet been classified. One of the statues, of colossal size, seems to represent an athlete of the Greek-Roman school brought to such perfection under Hadrian. Another represents a female figure, perhaps a Faustina. There are, besides, lovely busts of Hadrian, of Antinous, and others. It is difficult to state at what period these works of art were turned into building materials. Perhaps they met their fate in the Middle Ages, although I should not wonder if such things had happened before the fall of the Empire. Here is an example of statues walled up under Aurelian. A new gate is being bored through the walls of the city to afford a direct communication between the Esquiline and Saint Lorenzo fuori le Muri. Between the third and the fourth tower south of the old gate, the walls, ten feet thick, are patched up in the following way: the outside face is of brickwork of the time of Aurelian; the inside face belongs to an earlier building, of which Aurelian took advantage, as it fell exactly on the line of his projected ramparts. It is an enclosure or foundation-wall of a garden, handsomely ornamented with a rustic kind of mosaic made of shells, colored stones, and pieces of enamel, such as are often seen in Roman nymphæa and fountains. The wall had rows of niches for statues. Three niches have been found in cutting the new gate, and in front of each one the corresponding statue lay embedded in the nucleus of the wall. One represents a sitting Venus, of no artistic value; the second and the third represent fighting fauns, bright and spirited in their attitude, well chiselled, and beautifully preserved.—*The Athenæum.*

The Red-Brick Order.—The London *Pall Mall Gazette*, in a recent issue says: In its own way red brick is a very good thing indeed. It is warm in color; it is domestic; it sorts well with Dutch and English notions of home life; but it is not an architectural panacea. In London red brick is a simple necessity of the situation; no other good building material can be had within a convenient distance, and for all purposes of ordinary house-building brick or nothing is the Hobson's choice of the limited house-holder. Under these circumstances our architectural authorities of late years, turning over in their heads the question of sound, honest material for London dwellings, have wisely repudiated the time-honored maxim that Queen Anne is dead, and have revived Queen Anne in all her ruddy glory, from Fitzjohn Avenue to Hampstead, down to the humbler roofs of Bedford Park at Turnham Green. Being compelled to build in brick, they have sensibly decided to adopt a style based entirely upon brick as its material, instead of copying styles based upon solid stone, which is unattainable within the limits of what the *Saturday Review* will not allow us to call the metropolitan district. But a curious result of this accident or misfortune of the London basin has now begun to show itself in many provincial regions where good building-stone is cheap and abundant. Visitors to London have got into their heads the notion that brick is fashionable, and they have accordingly set about building brick houses, brick schools and brick public offices in places where stone is quite as cheap and far more desirable. Anxious to be in the height of the architectural mode, they have taken to putting up Queen Anne erections where Queen Anne ought never to have shown her royal red face at all. Instead of building pretty houses of the same strictly domestic type in local stone and in styles adapted to stone, they seem to fancy that if they adopt the new æsthetic fancies at all they must adopt them in their entirety, material and all. In fact, they want to reverse the boast of Mæcenas and Baron Haussman, and to leave a city of brick where they found a city of marble.

A Water-Curtain for Theatres.—A tank containing a continuous supply of water is fitted over the part to be protected; the water in the tank being used for general purposes also. In this tank a curtain of woollen material is kept immersed, which is caused to descend by its own weight, and which may be undone automatically, when it instantly becomes a fire-resisting screen. The suctional nature of the material attracts the water down the curtain in a siphon-like manner, forming a complete cascade of water, flowing down the already saturated curtain, which the flames cannot burn. It can be lowered into the fire without being burned or receiving any damage, a feature that cannot be accomplished by water-curtains which have to be saturated whilst descending. The inventors also propose some improved appliances for extinguishing fires by the use of existing gas-fittings. In this case the gas-main is connected with that for water, having junction-cocks, levers, and pull-lines leading to stations inside and out the building. The supply of gas can be instantly shut off and water turned on in the event of fire, leaving the necessary guide-lights burning. In theatres there are at command a multitude of gas-jets, or outlets, between borders, cloths, wings, set pieces, rows, etc, in the parts in which fires generally originate. Suspending iron rods are applied to existing gas-battens and work vertically, thus admitting of their being raised and lowered from gridirons without swinging up or down the stage, thereby preventing their frequent contact with scenery and effects. The gas is an indicator of the perfection of the outlets, and the readiness of the apparatus for extinguishing purposes. For buildings, offices, etc., where gas-jets are not so numerous, an apparatus of a decorative character is used, which, although forming part of the existing gas-fittings, will only admit of water passing when needed. By this invention the water can be set to work simultaneously over the entire building, or should it be necessary to localize the action to one part only, this can be done, still leaving the other gas burning.—*Iron.*

A new European Canal.—The newest of the many European canal projects is one for uniting Cologne with Antwerp. A Dutch engineer is the author of it and is said to have already secured from the Cologne Chamber of Commerce a promise of warm support. He has petitioned the German Government for financial assistance.

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BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

267,326. DRAIN TILE OR PIPE. — Newton B. Childs, Kansas City, Mo.

267,332. WOOD-TURNING LATHE. — Cyrus A. Curtis, Chicago, Ill.

267,336. PROTRACTOR. — Alexander H. Ege, Mechanicsburg, and Chas. D. Walters, Harrisburg, Pa.

267,354. LATHE. — Jacob B. Lisle, Springfield, O., assignor to himself and Oliver S Kelly, same place.

267,355. WEATHER-STRIP. — William H. Lynchard and George S. Saunders, Mount Pleasant, Iowa.

267,381. BEVEL AND GAUGE. — John S. Thornburg, Clinton, Iowa.

267,385. BRIDGING FOR JOISTS. — Henry B. Walter, Cincinnati, O.

267,398. BOLT. — James P. Black, Nelson, New Zealand.

267,399. FIRE-ESCAPE. — Nicholas H. Borgfeldt, New York, N. Y.

267,447. LOCK-HINGE. — August Müller and Josef Wolf, New York, N. Y.

267,448. LOCK-HINGE FOR SHUTTERS. — August Müller and Josef Wolf, New York, N. Y.

267,479. CHIMNEY-COWL. — Winfield S. Beebe, Middletown, Conn.

267,481. CENTERING BEVEL AND TRY SQUARE. — Charles L. Bellamy, Arlington, N. J.

267,495. PAINT. — Geo. J. Cline, Goshen, Ind.

267,499. GRATE-BASKET. — Charles F. W. Dankers, New Orleans, La.

267,503. BURGLAR-ALARM. — Russell G. Dudley, Jersey City, N. J.

267,504. FIRE-ESCAPE. — J. Paris Dunn, Brooklyn, N. Y.

267,505. WRENCH. — James Du Shane, South Bend, Ind.

267,515. SCAFFOLD. — Robert M. Googe, Fleming, Ga.

267,541. SAFETY-GUARD FOR ELEVATOR-HATCHWAYS. — Edward G. Kendall, Boston, Mass.

267,578. FIRE-ESCAPE. — Robert Pallett and Francis Nahedy, New York, N. Y.

267,590. BIT AND COUNTERSINK. — Aurelius O. Revenaugh, Jackson, Mich.

267,618. ROLLING WINDOW-SCREEN. — Thomas Tribe, Colorado Springs, Col.

267,649. STOP FOR ELEVATORS. — Lorenzo D. Hawkins, Stoneham, and John H. Webster, Boston, Mass.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report thirty permits have been granted, the more important of which are the following: —

Wm. Diven, three-st'y brick building, e s Gilmor St., s of Baker St.

Elizabeth W. Long, 2 three-st'y brick buildings, e s Gilmor St., s of Baker St.

Wm. Horn, 2 three-st'y brick buildings, n s Orleans St., e of Eden St.

Ferdinand Passano, 4 two-st'y brick buildings, Madeira Alley, between Pratt and Gough Sts.

O. Swingley, three-st'y brick building, w s Arlington Ave., s of Edmondson Ave.

George Beck, two-st'y brick building, Hampstead St., between Bond and Bethel Sts.

W. T. Phillips, 7 three-st'y brick buildings, w s Gilmor St., commencing n w cor. Gilmor and Mulberry Sts.

J. B. Irvine, 4 two-st'y brick buildings, w s Mount St., s of Franklin St.

J. B. Irvine, 7 three-st'y brick buildings, w s Mount St., n of Baltimore St.

J. B. Irvine, 7 three-st'y square brick buildings, Mount St, between Baltimore and Fayette Sts.

John Fox, 4 three-st'y brick buildings, Presstman St, between Etting St. and Druid-Hill Ave.

John N. Foss, 7 two-st'y brick buildings, Chesapeake St., between Hudson and Lancaster Sts.

E. W. Gorman, 5 two-st'y brick buildings, Luzerne St., between Alice-Ann St. and Canton Ave.

Stephen McGowan, 6 two st'y square brick buildings, Sterrett Alley, between Hamburg and Cross Sts.

Paul Armonn, two-st'y brick building, e s Cannon St., n of Alice-Ann St.

Israel Gable, two-st'y brick stable, in rear of 128 Ridgely St., between Cross and West Sts.

Brooklyn.

BUILDING PERMITS.—*Bushwick Ave.*, w s, 50′ s McKibben St., three-st'y frame store and tenement, tin roof; cost, $3,500; owner, etc., Henry Loeffler, 192½ Stockton St.

Stanhope St., s s, 150′ e Central Ave., three-st'y frame tenement, gravel roof; cost, $3,500; owner, etc., Chas. Isbill, 479 Herkimer.

Java St., No. 59, n s, 175′ e West St., three-st'y frame tenement, tin roof; cost, $4,000; owner, W. H. Nevarrow, 61 Java St.; builder, Thos. Davis.

Waverly Ave., e s, 200′ n Atlantic Ave., one-st'y brick stable, gravel roof; cost, $3,200; owner, Mr. Richardson, 676 Washington Ave.; builders, John J. Bintzen and Howard J. Smith.

South Second St., No. 225, n s, 100′ e Sixth St., three-st'y and basement brick dwell., tin or gravel roof; cost, $9,500; owner, Thomas N. Harris, 307 South Second St.; architect, Ernest Dennis; builder, William L. Langridge, Jr.

Newtown Creek, 600′ n Greenpoint Ave., one-st'y brick storage shed, gravel roof; cost, $9,000; owner, L. V. Sone, 116 Pearl St., New York; builders, Jas. Rooney and Thomas Davis.

Freeman St., No. 213, n s, 125′ w Oakland Ave., three-st'y frame tenement, felt and gravel roof; cost, $3,150; owner, Mr. Horkins, Freeman St.; architect, A. Gamble; builders, Peter Cawley and Port & Gamble.

Broadway, e s, 80′ n Van Buren St., three-st'y frame store and dwell., tin roof; cost, $4,000; owner, James P. Little, 1019 Broadway; architect and builder, R. H. Heasman.

Park Ave., n e cor. Grand Ave., 2 four-st'y brick stores and tenements, tin roof; cost, each, $9,000; owner and builder, N. F. Griffiths, 94 Clason Ave.; architect, J. D. Reynolds.

Skillman St., Nos. 27 *and* 29, one-st'y brick mill, gravel roof; cost, about $3,500; owner, Gutta Percha and Rubber Co., office, Franklin Ave.; architect, John Murphy; builders, Jas. Noble and P. O'Brien.

Troy Ave., No. 38, w s, 160 s Herkimer St., three-st'y frame dwell., tin roof; cost, $3,000; owner, J. B. King, 5 Bainbridge St.

Boston.

BUILDING PERMITS. — *Brick.* — *Tufts St.*, cor. Medford St., Ward 3, for City of Boston, two-st'y flat storage and workshop, 30′ x 48′; Fred. H. Tarbox, builder.

Newbury St., No. 259, Ward 11, for Silas W. Merrill, three-st'y and mansard dwell., 25′ x 58′; Silas W. Merrill, builder.

Wood. — *Farnham St.*, near Gerard St., Ward 20, for O. H. Drisko & Co., two-st'y flat box-manufactory, 50′ x 100′; O. H. Drisko & Co., builders.

Central Ave., near Berry St., Ward 23, for Edw. K. Johnson, two-st'y pitch dwell., 18′ x 28′; John A. Crosby, builder.

Unnamed St., near South St., Ward 23, for Wm. J. Miller, 2 two-st'y pitch dwells., 19′ x 30′; ell, 10′ 6″ x 12′; John C. Betts, builder.

Shelton St., near Adams St., Ward 24, for Bernard Minton, one-st'y pitch greenhouse, 16′ x 116′; Michael Ryan, builder.

Warren St., near Howland St., Ward 21, for S. S. Campbell, two-st'y pitch dwell., 14′ and 20′ 6″ x 40′; C. H. Wetmore, builder.

Bearse Ave., near Butter St., Ward 24, for Frank Rogers, two-st'y pitch dwell., 21′ and 24′ 6″ x 28′; ell, 15′ x 16′; Frank Rogers, builder.

I St., cor. East Fifth St., Ward 14, for Messrs. Locke & Nolan, 6 one-st'y mansard dwells., 19′ x 36′; Locke & Nolan, builders.

I St., cor. East Fifth St., Ward 14, for Messrs. Locke & Nolan, one st'y pitch storage, 25′ x 35′; Locke & Nolan, builders.

Virginia St., near Bird St., Ward 20, for Frank L. Young, two-st'y pitch dwell., 26′ x 29′ and 35′; M. Shields, builder.

Mt. Bowdoin Summit, near Mt. Bowdoin Ave., Ward 24, for Andrew J. Mallon, two st'y pitch dwell., 56′ and 63′ x 68′; J. W. Coburn & Co., builders.

Wakulla St., near Dale St., Ward 21, for Christopher Kenney, two-st'y pitch dwell., 22′ and 25′ x 30′; ell, 20′ x 23′; Kennedy & McHeffey, builders.

West Sixth St., No. 102, Ward 13, for Patrick Keenan, three-st'y flat dwell., 22′ x 42′; Patrick Hanlon, builder.

Brighton Ave., near Linden St., Ward 23, for Samuel N. Davenport, two-st'y pitch dwell., 32′ x 34′; ell, 7′ x 21′; Samuel N. Davenport, builder.

Chicago.

STRIKE. — The threatened strike of the bricklayers, if it is consummated, will have the effect of seriously delaying many buildings now in the course of erection. The trouble is that they demand pay for ten hours' work, whether it is performed or not. The days are getting so short that it is impossible to work after five o'clock, and thus an hour is lost, which employers refuse to pay for. It would seem that it is too late in the season to inaugurate such a move, as cold weather will soon put a stop to all operations, and the amount gained, even if they should be successful in their demands, would be far less than the amount lost through being idle for a few weeks or even days.

HOUSES. — Horace F. Waite is to build three pressed brick dwellings with stone finish, three-st'y and basement; to cost $25,000; Treat & Foltz, architects.

APARTMENT HOUSES. — S. B. Williams is building a four-st'y and basement apartment house on Locust St., near Wells St., 55′ x 70′, which will cost $30,000; from plans by Treat & Foltz; and E. Earnshaw is to build an apartment house on Ontario St., near Pine St., to cost $20,000; designed by the same architects.

BUILDING PERMITS. — Mrs. Mary Keller, 3 three-st'y brick stores and dwells., 60′ x 100′, 2 to 237 W. Harrison St.; cost, $20,000; G. Zucker, architect.

Elizabeth H. North, three-st'y and basement brick dwell., 30′ x 70′, 26 Walton Place; cost, $10,000.

Smith & Coplein, two st'y and basement brick store and dwell., 40′ x 60′, 53 and 55 Wells St.; cost, $4,800.

A. T. Ewing, 12 two-st'y brick dwells, 20′ x 38′, cor. Thirteenth and Oakley Sts.; cost, 25,000.

C. F. Gross, one-st'y and basement brick store, 47′ x 70′, 272 and 274 Sedgwick St.; cost, $3,500.

Henry F. Sheridan, two-st'y and basement brick dwell., 22′ x 46′, cor. Twenty-sixth and Murray Sts.; cost, $5,000.

Robert C. Hoopes, two-st'y brick dwell., 22′ x 44′, 1314 Jackson St.; cost, $4,500.

John Fortune, two-st'y and basement brick dwell., 23′ x 42′ 213 So. Sangamon St.; cost, $3,000.

C. A. Holander, three-st'y and basement brick dwell., 22′ x 82′, 94 Sedgwick St.; cost, $6,000.

M. Loskle, two-st'y and basement brick store and dwell., 21′ x 51′, 658 Dixon St.; cost, $2,400.

Toolen & Maloney, two-st'y and basement brick dwell., 21′ x 50′, 3543 Dearborn St.; cost, $3,500.

D. I. Pinckney, three-st'y and cellar brick flats, 53′ x 61′, 153 and 155 So. Wood St.; cost, $8,000.

John Moeller, three-st'y and attic brick store and dwell., 24′ x 62′, 2913 Wentworth Ave.; cost, $6,000.

Geo. Trumbull, 2 two-st'y and basement brick dwells., 41′ x 53′, Ellis Ave., s of Thirty-seventh St.; cost, $8,000.

John Sokup, three-st'y and basement brick store and flats, 25′ x 80′, 1176 Milwaukee Ave.; cost, $8,000.

P. Rabbitt, two-st'y and basement brick store and dwell., 24′ x 70′, 609 Centre Ave.; cost, $4,000.

Cincinnati.

FACTORY. — The Strobrige Lithographing Company are to erect a new building for their business. The site is on the canal near Elm St., fronting 150 feet on the canal, and being 90 feet deep. It will be six-stories, of a plain but substantial character, and will cost about $50,000; Mr. Samuel Hannaford is the architect.

BUILDING PERMITS. — John Wile, three-st'y brick dwell., No. 115 Browne St.; cost, $6,000.

Henry Jacob, three-st'y brick dwell., Jefferson St., near Corey St.; cost, $6,000.

Three permits for repairs; cost, $200.

Cleveland.

RAILROAD BUILDINGS.—Passenger station and track-house, for the New York, Chicago & St. Louis Ry., (East side) cost, $65,000; Louis Cowles, architect; Chas. E. Cole, superintendent.

Freight-house (East side), wooden; cost, $13,000; Louis Cowles, architect; Chas. E. Cole, superintendent.

Passenger station (South side): cost, $6,000.

Freight-house (South side); cost, $3,000; Chas. E. Cole, architect and superintendent.

Mr. Cole has also made plans for quite a little passenger station at Euclid Ave., on entrance to Lake View Cemetery, where President Garfield is buried, to cost $4,000; but which has not been commenced yet.

Detroit.

BUILDING PERMITS.—The following are the most important of the permits granted since our last report:—

A. C. Varney, double brick house, No. 229 Howard St.; cost, $4,000.

A. E. French, brick house, Montcalm St.; cost, $3,400.

E. Schwicking, 2 brick stores, Michigan Ave.; cost, $6,000.

Gideon Vivier, 2 brick houses, Twelfth St.; cost, $4,000.

Sutton & Backus, brick house, Forest Ave.; cost, $4,500.

R. S. Hawley, frame house, Hancock Ave.; cost, $3,000

Blay & Son, brick house, Adams Ave.; cost, $8,000.

T. S. Reath, brick house, No. 70 Adams Ave.; cost, $4,500.

H. Scheible, frame house, Orleans St.; cost, $2,800.

Leo Scheible & Co., brick house, Clinton Ave.; cost, $3,800.

Geo. Hatt, frame house, Alexandrine Ave.; cost, $3,100.

Kirshner & Co., frame house, Selden Ave.; cost, $3,500.

S. Beattie, brick house, Garfield St.; cost, $3,500.

M. Scoville, brick house, Macomb Ave.; cost, $5,000.

W. H. Holcomb, brick house, Fourth Ave.; cost, $5,000.

H. Carew, double brick dwell., Elizabeth St.; cost, $5,000.

Hart & Co., brick factory, Franklin St.; cost, $25,000.

New York.

COMPETITION.—New York Mutual Life Ins. Co. has requested six eminent architects to submit paid competition plans for their new building.

NEW WORK. — Very few important buildings have lately been projected in the architects' offices, but recent sales of real estate, with conditions for improvements attached, necessitate a considerable amount of new work. Nothing has yet been decided on the New York Mutual Life Insurance Building or the Cotton Exchange, and several other large building enterprises are in abeyance, including two theatres.

HOUSES.—8 three-st'y dwells., to cost $109,000 are to be built by Mr. Stephen Wright.

CONTRACT.—The contract for glazing work at the Barge Office, has been awarded to Simon Bache, and the contract for heating the southern wing of the extension to the Custom-House, Cleveland, to Bartlett, Hayward & Co., at $8,900.

BUILDING PERMITS.—*Broome St.*, s e cor. Goerck St., five-st'y brick tenement and store, tin roof; cost, $16,000; owner, Dieterich Ottersted, Spring Valley, N. J.; architect, John McIntyre; builder, H. Holwedel.

Broome St., s s, 25′ e Goerck St., five-st'y brick tenement and store, tin roof; cost, $13,000; owner, architect and builder, same as last.

Cliff St., No. 83, five-st'y brick boiler and storage-house, tin roof; cost, $20,000; owners, Harper Bros., Franklin Sq.; architects, J. C. Cady & Son; builder, Marc Eidlitz.

East Sixteenth St., Nos 429 *and* 433, 2 five-st'y brick tenements, tin roof; cost, each, $14,000; owner, John Schmitt, 602 East Seventeenth St.; architect, J. Hoffmann.

Twenty-second St., s s, 175′ e Eighth Ave., 2 five-st'y brick apartment-houses, tin roof; cost, each, $25,000; owners and builders, W. P. and A. M. Parsons 842 Lexington Ave.; architects, Thom & Wilson.

West Thirty-fourth St., Nos. 524 *and* 526, five-st'y brick paper-hanging factory, gravel roof; cost, $22,000; owner and architect, Richard Gledhill, 423 West Thirty-fourth St.; builders, W. B. Pettit and Jno. Farrell.

West Forty-fourth St., No. 32, two-st'y brick stable and dwell., tin or gravel roof; cost, $12,000; owner, Washington E. Connor, 14 East Forty-fifth St.; builders, Jacob V. Myers, and A. G. Bogart & Bro.

First Ave., No. 440, three st'y brick office and factory, gravel roof; cost, about $6,500; owner, Carl H. Schultz, on premises; architect, E. E. Raht; builders, Joseph Johnston and C. W. Klappert's Sons.

East Twenty-seventh St., No. 226, five-st'y brick

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tenement, tin roof; cost, $12,000; owner and builder, Cornelius Callahan, 226 East Twenty-seventh St.

Ninth Ave., No. 676, four-st'y brick warehouse, with extension, tin roof; cost, $9,000; owner, Christian Striffler, 265 West one Hundred and Twenty-seventh St.; architect, C. F. Ridder, Jr.; builders, Thos. Cockerill and Fessler & Wolfarth.

Sixty-fifth St., s s, 230′ w Second Ave., 3 four-st'y brownstone apartment-houses, tin roof; cost, each, $18,000; owner, Mrs. Sarah T. McCool, 227 East Seventy-ninth St.; architect, J. C. Burne.

East Seventy-fifth St., Nos. 325 *and* 327, n s, 325′ e Second Ave., 2 five-st'y brownstone tenements, tin roof; cost, each, $12,000; owner and architect, John Sullivan, 1365 Lexington Ave.

Eighty-sixth St., s s, 100′ w Second Ave., 6 four-st'y brownstone flats, tin roof; cost, each, $22,000; owner, Wm. Henderson, 511 East Eighty-second St.; architect, J. C. Burne.

East One Hundred and Ninth St., No. 163, n s, 245′ w Third Ave., four-st'y brick tenement, tin roof; cost, $15,000; owner, Elizabeth Seitz, 84 East One Hundred and Eighth St.; architect, J. Hoffman.

Third Ave., n e cor. One Hundred and Eighth St., four-st'y brownstone store and tenement, tin roof; cost, $15,000; owner, Jacob L. Maschke, 65 Forsyth St.; architect, J. C. Burne.

Third Ave., e s, 25′ n One Hundred and Eighth St., four-st'y brownstone store and tenement; tin roof; cost, $15,000; owner and architect, same as last.

Second Ave., n w cor. One Hundred and Eighth St., four-st'y brownstone store and tenement, tin roof; cost, $14,600; owner, etc., same as last.

Second Ave., w s, 25′ n One Hundred and Eighth St., four-st'y brownstone store and dwell., tin roof; cost, $14,000; owner, etc., same as last.

East Seventy-sixth St., No. 418, five-st'y brick tenement, tin roof; cost, $14,000; owner, Eve Mueller, 246 East Seventy-sixth St.; architect, John Brandt.

Seventy-seventh St., n s, 95′ e Third Ave., 2 five-st'y brick and stone tenements, tin roofs; cost, each, $17,000; owners and builders, Breen & Nason, 349 and 351 East Fifty-ninth St.; architect, George W. Hughes.

One Hundred and Twelfth St., n s, 160′ w Third Ave., 2 five-st'y brick and stone tenements, tin roofs; cost, each, $15,000; owner, Patrick H. Lalor, 121 East One Hundred and Sixteenth St.; architect, A. B. Ogden.

One Hundred and Thirtieth St., n s, 250′ e Twelfth Ave., two-st'y brick dye-house or factory, gravel roof; cost, $9,700; owner and architect, James Halstead, One Hundred and Seventeenth St., bet. Ninth and Tenth Aves.; builders, Wm. Cowen & Son and Jas. Pettit.

One Hundred and Thirty-sixth St., n s, 225′ e Seventh Ave., two-st'y brick stone-dressed church and school-room, slate and tin roof; cost, about $7,000; owner, Church of Holy Innocents; architect, J. H. Buck.

One Hundred and Fifty-second St., n s, 175′ e Tenth Ave., one-and-a-half-st'y frame dwell., shingle roof; cost, $4,000; owner, Henry Webendorfer, 490 West One Hundred and Fifty-third St.

Sedgwick Ave., w s, 2,00′ s Morris Dock Station, three-st'y frame dwell., tin and slate roof; cost, $3,500; owner, A. E. A. Marshall, 450 Fourth Ave.

ALTERATIONS.—*West Nineteenth St., Nos.* 540 *and* 542, to be raised two stories, also three-st'y brick extension; owners, Stewart & Co., 472 West Twenty-fourth St.; builder, James T. Stevenson.

West Twenty-third St., No. 14, raise upper st'y, 6′, and a one-st'y brick extension, tin roof, also new store front; cost, $15,000; owner, estate of Geo. R. Jones, F. R. Jones, exr., 312 East Eighteenth St,; architect, H. J. Hardenbergh.

West Twenty-third St., Nos. 139, 141, *and* 143, build buttresses on side walls, and alter the interior for a theatre; cost, $15,000; lessee, Salmi Morse, 139 West Twenty-fourth St.; architect, H. Ed. Ficken; builder, A. Gibbons.

Thompson St., No. 212, four-st'y brick extension, tin roof, also alterations to front and interior; cost, $6,500; owner, Chas G. Moller, 96 Wall St.; builder, Cornelius Callahan.

Philadelphia.

STABLE.—Stable for George Burnham, Esq., Twenty-third St., below Green St.; Wilson Bros. & Co., architects.

SUNDAY-SCHOOL.—Sunday-School building for the Episcopal Hospital; Wilson Bros. & Co., architects.

ALTERATIONS to residence of Wm. M. Viguers, No. 3,611 Baring St.; Wilson Bros. & Co., architects.

G. W. Kendrick, No. 3,507 Baring St.; Wilson Bros. & Co., architects.

HOUSES.—A stone house, to cost $60,000, is to be built for Mr. John H. Converse, at Rosemont.

And another for Dr. Edward H. Williams at same place; both from designs of Messrs. Wilson Bros. & Co.

For Mr. Thomas Sparks, a cottage of brick with stone and terra-cotta finish, is to be built at the cor. of Thirty-third and Race Sts., at a cost of $14,000; from designs of same gentlemen.

BUILDING PERMITS.—*North Fourth St., No.* 820, two-st'y dwell., 15′ x 20′; Chas. O. Kronglowicz, contractor.

Twelfth St., w s, s of Snyder Ave., one-st'y addition to factory, 21′ x 51′; Jos. Bird, contractor.

Ninth St., w s, s of Dickerson St., 6 two-st'y dwells., 15′ x 42′; Thos. E. Nesbit, owner.

Front St., e s, n of Willow St., freight shed, 17′ x 150′; Reading R. R. Co., owners.

Thirty-first St., w s, n of Wharton St., 4 three-st'y dwells., 20′ x 40′; Harbert, Russell & Co.

Reading R. R., cor. Twenty-first St., two-st'y office-building, 60′ x 62′; T. H. Doan, contractor.

Cemetery Lane, w s, n of Ridge Ave., two-st'y dwell., 18′ x 48′; Sturges & Heath, contractors.

Ridge Road, w of Scott's Lane, boiler-house, 18′ x 35′; J. & J. Dobson, owners.

Thirty-fourth St., n e cor. Powelton Ave., 7 three-st'y dwells., 19′ x 72′; W. S. Kimball, owner.

Forty-first St., cor. Chestnut St., 2 three-st'y dwells., 20′ x 55′; W. S. Kimball, owner.

Howell St. Nos. 1912 *and* 1914, new front and alterations to stable, 30′ x 60′; W. C. Mackie, contractor.

St. Louis.

BUILDING PERMITS.—Twenty-seven permits have been issued since our last report, fifteen of which are for unimportant frame houses; of the rest those worth $2,500 and over are as follows:—

Mrs. H. Beers, three-st'y brick flats; cost, $21,000; architect, J. B. Legg; contractor, Aug. Wieden.

F. Rozier, two-st'y addition brick store; cost, $10,000; architect, F. D. Lee; contractor, J. L. Guedry.

G. Grabbe, two-st'y brick dwell.; cost, $6,000; architect, Mortimer; contractor, H. Hussman, Jr.

A. Atkins, two-st'y brick dwell.; cost, $6,500; architect, T. Annan; contractor, T. Roach.

Washington.

BUILDING PERMITS.—Permits issued from November 1st to 15th.

Dennison & Cushing, three-st'y office-building, 22′ x 40′, F St., n w bet. Ninth and Tenth Sts.; cost, $4,000.

Mrs. E. Gelson, three-st'y brick dwell., 22′ x 57′, s e East Capitol St., bet. Sixth and Seventh Sts.; cost, $4,000.

Judge C. J. Hillyer, 5 three-st'y brick dwells., 20′ x 38′, Hillyer Ave., bet. Twentieth and Twenty-first Sts.; cost, $25,000.

Linticum Institute, 4 three-st'y brick dwells., 20′ x 57′, cor. Green and Washington Sts.; cost, $25,000.

Adelaide Wright, 2 two-st'y brick dwells., 13′ x 26′, s w Tenth St., bet. D and E Sts.; cost, $2,500.

E. J. Hill, 2 three-st'y brick dwells., 16′ x 34′, n w Twenty-second St., bet. N and O. Sts.; cost, $5,000.

C. C. Meader, 6 two-st'y brick dwells., 12′ x 26′ s w I and L Sts.; cost, $3,000.

A. M. Gibson, three-st'y brick dwell., 27′ x 58′, N. H. Ave., and Dupont Circle; cost, $10,000.

Jas. L. Waters, two-st'y brick dwell., 20′ x 31′, n w Third Sts., bet. B and C Sts.; cost, $4,400.

J. W. Sanderson, three-st'y brick dwell., 22′ x 28′, s e A St., bet. Sixth and Seventh Sts.; cost, $3,500.

Metropolitan R. R. Co., two-st'y grist mill, 38′ x 52′, n w P St.; cost, $2,000.

Messrs. A. E. F. Stewart, repairs after fire, the Stewart Mansion, Dupont Circle; cost, $20,000.

General Notes.

ATLANTIC CITY, N. J.—House for W. F. Ladner, Esq.; Chas. Supplee, of Philadelphia, contractor; A. P. Benner, architect.

CHICAGO, ILL.—By the United Rolling Stock Co., a set of car-shops, near Chicago; Wilson Bros. & Co., architects, Philadelphia, Pa.

LAKE GEORGE, N. Y.—On Green Island a hotel is to be built; plans by Wilson Bros. & Co., architects, Philadelphia, Pa.

MINNEAPOLIS, MINN.—A house and office for Dr. F. A. Dunsmoor is now building, at the cor. of Third Ave. and Tenth St. It is of brick, and measures 76′ x 80′. Mr. M. P. Hapgood, of Hartford, Conn., is the architect.

PORTSMOUTH, N. H.—Cottage for G. T. Comins, of Boston, Mass.; Wilson Bros. & Co., architects, Philadelphia, Pa.

WHITE PLAINS, N. Y.—A house to cost $20,000, is to be built from designs of Mr. Carl Pfeiffer, of N. Y.

PROPOSALS.

FORCE-PUMPS, ETC. [At Sand Beach, Mich.]

OFFICE OF SUPERINTENDENT OF LIFE-SAVING STATIONS, Tenth District, SAND BEACH, MICH., November 9, 1882.

Sealed proposals will be received at this office **until 12 o'clock, noon, of Thursday, the 30th day of November, 1882,** for furnishing force-pumps, etc., to be delivered at Sand Beach, Mich., for use of the life-saving service.

The force-pumps, etc., needed, consist of, twelve double-brake force-pumps, each provided with handles to operate, with wood screws sufficient to fasten, and with six feet of three-inch gas-pipe fitted for suction; the discharge-pipe to be large enough to force water through one-and-a-half-inch hose, and warranted to throw water forty feet high. Eighteen hundred feet of three-ply one-and-a-half-inch rubber hose with brass couplings fitted every fifty feet, and twelve common brass nozzles.

Proposals to furnish these articles must explain the style and manufacturers' number of pump, and the manufacturers' name of hose.

Proposals to be addressed to the undersigned and indorsed "Proposals for Force-Pumps, etc."

The right is reserved to reject any or all bids, and to waive defects, if deemed for the interest of the Government. JEROME G. KIAH,

361 Supt. Life-Saving Stations, Tenth District.

FIRE-PROOF SHUTTERS, BOXES, ETC. [At Cincinnati, O.]

OFFICE of SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., November 20, 1882.

Sealed proposals will be received at this office **until 12 M., on the 11th day of December, 1882,** for furnishing and putting in place complete, the fire-proof shutters, boxes, etc., required for the Custom-House, etc., at Cincinnati, O., in accordance with drawings, specification and schedule, copies of which and any additional information may be had on application at this office, or the office of the Superintendent. JAS. G. HILL,

361 Supervising Architect.

JOINERS' WORK AND WOOD FLOORING. [At Albany, N. Y.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., November 18, 1882.

Sealed proposals will be received at this office **until 12 M., on the 7th day of December, 1882,** for furnishing and fixing in place complete, all the joiners' work and wood flooring required for the Custom-House, etc., at Albany, N. Y., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office, or the office of the superintendent.

362 JAS. G. HILL, Supervising Architect.

PROPOSALS.

GLASS. [At Philadelphia, Pa.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., November 14, 1882.

Sealed proposals will be received at this office **until 12 M., on the 2d day of December, 1882,** for furnishing and delivering, ready for fixing in place, all the plate, double-thick sheet and double-thick ground glass required for the Court-House and Post-Office at Philadelphia, Pa., in accordance with specification, schedule and diagrams, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

361 JAS. G. HILL, Supervising Architect.

ENCAUSTIC AND SLATE TILING. [At Columbus, O.]

Sealed proposals will be received by the Trustees of the Ohio Institution for Feeble-Minded Youth, at Columbus, until **Thursday, December 7, 1882, at 12 o'clock, M.,** for all encaustic or slate tiling and base required for the new buildings.

Plans and specifications can be seen at the office of the Superintendent, at the Institution.

All proposals should be addressed to John A. Shank, President of the Board of Trustees, and endorsed, "Proposals for Encaustic or Slate Tiling and Base."

JOHN A. SHANK,
J. K. RUKENBROD,
J. M. HOLMES,
B. B. WOODBURY,
M. A. DAUGHERTY,

362 Trustees.

IRON-WORK. [At Toledo, O.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., November 10, 1882.

Sealed proposals will be received at this office **until 12 M., on the 4th day of December, 1882,** for furnishing and fixing in place the cast-iron stands under columns, rolled iron beams, girders, etc., required for first story of the Court-House and Post-Office at Toledo, O., in accordance with drawing, specification and schedule, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

361 JAS. G. HILL, Supervising Architect.

IRON BRIDGE. [At Springfield, Mass.]

The Connecticut River Railroad Company proposes to build a double-track, through, wrought-iron bridge, across the Connecticut River opposite the city of Holyoke, Mass., to be completed for use early next summer

The bridge will be of five spans; each 152 feet from centre to centre of piers, and 27 feet from centre to centre of trusses, with a walk outside of the truss, for foot-passengers, 6 feet wide.

The trusses to be proportioned to support, in addition to the weight of the structure itself — the rails, ties, guards, etc., — a rolling load of 3,000 lbs. per lineal foot, having at its head a consolidation engine of 96,000 lbs.

This bridge is to take the place of a Howe Truss bridge, through which forty-five trains pass each day.

The traffic of the road is not to be disturbed in putting up the new bridge and in removing the old bridge.

The piers are level on the top, 6½ feet wide, standing at an angle of 72 degrees with the line of the bridge, and 34 feet above low-water mark.

The company does not propose to furnish specifications for the building of this bridge, but desires each bidder to present plans for a first-class bridge.

All specifications and bids will be submitted to a special expert and the selection of the bridge to be built will be determined by the character of the bridge proposed, and the price named for the removal of the old and construction of the new bridge.

The bids to be forwarded to reach the office in Springfield, Mass., **by December 1.** The company to retain the right to reject all proposals. It is desirable also that the proposals should state the time required to place the new bridge and remove the old bridge.

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HOT-WATER HEATING-APPARATUS. [At Paducah, Ky.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, November 4, 1882.

Sealed proposals will be received at this office until **12 M., on the 27th day of November, 1882,** for furnishing and fixing in place complete in the Court-House and Post-Office at Paducah, Ky., a low-temperature hot-water heating-apparatus, in accordance with drawings and specification, copies of which, and any additional information, may be had on application at this office, or the office of the Superintendent. JAS. G. HILL, Supervising Architect.

PENSION OFFICE-BUILDING. [At Washington, D. C.]

OFFICE OF SUPERVISING ENGINEER AND ARCHITECT. DEPARTMENT OF THE INTERIOR. No. 1316 N Street, n w. WASHINGTON, D. C., November 1, 1882.

Separate sealed proposals will be received at this office till **noon on Saturday, the 2d day of December, 1882,** for furnishing and delivering at the site of the new Pension Building on Judiciary Square in this city, foundation-stone, broken stone for concrete, bricks, cement, lime, sand, coloring matter for mortars, terra-cotta consoles, brackets and pilaster caps, and for excavation and grading, for all labor in laying concrete foundation, for all labor in building foundation and cellar walls of rubble-stone, and for all labor in laying bricks required for the construction of a fire-proof building for the United States Pension Office. Specifications may be obtained from this office. M. C. MEIGS, Supervising Engineer and Architect.

361 Bvt. Maj.-Gen'l. U. S. A.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 362.

DECEMBER 2, 1882.

Entered at the Post-Office at Boston as second-class matter.

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WE invite the attention of our subscribers and readers in general to the important notice concerning the temporary reduction in the subscription-price of the *American Architect* for the ensuing year, which will be found on page xi. We trust that a large number of draughtsmen who have hitherto enjoyed the privilege of reading their employers' copies will take advantage of this fleeting opportunity to become subscribers in their own names.

ONE of the distressing occurrences which come every few weeks to remind us, generally in vain, of the duty which those who construct and occupy buildings owe to their fellow-creatures whose lives may depend upon their foresight, was reported last week from Providence, where a building containing two manufactories of jewelry, both of them full of operatives, was set on fire by the ignition of the naphtha with which a man who occupied one of the rooms was cleaning clothes beside a stove, and burned quickly to the ground. As usual in such cases, the only staircase was immediately seized upon by the flames, cutting off all means of escape except by jumping from the windows to the ground, a distance of about fifty feet. This many of the operators ventured to do, with greater or less success, three being instantly killed, three more fatally injured, and sixteen bruised and maimed, many of them for life. One man, more fortunate than the rest, clung to the telephone-wire, although his hands were scorching, until the firemen arrived with ladders; and two poor girls were saved by the courage and address of a sailor, who, climbing a ladder which was too short for its purpose, balanced himself on the top round, and in that position caught them and handed them safely to the ground.

A GREAT deal of complaint is made in New York about the operations of the various steam-heating and power companies, which tear up the pavements and obstruct the streets, to the annoyance of business men and the detriment of traffic. Generally the first excavation, made for the purpose of laying main pipes, is only the beginning of a series of "assaults upon the streets," as the *Tribune* calls them; for no sooner is the main laid than private connections have to be made to supply customers, each necessitating the digging of a trench half-way across the street; while the turning of the steam into the pipes is very likely to disclose a leak or defect in some valve or pipe, which not only allows clouds of offensive vapor to ascend into the street, or penetrate neighboring basements, but makes it necessary to break up the pavement and interrupt traffic a third time. A *Tribune* reporter counted the other day ten obstructed streets in the small territory bounded by Broadway, Wall, Gold, and Fulton Streets, and as the pipe-laying has now been carried on for seven months without intermission, it is not surprising that those who derive no benefit from the new system should have lost patience.

A VERY ingenious electric clock for use in railway stations has been recently exhibited in Boston, which will give the signals for starting trains automatically at any time and with perfect precision, the apparatus being automatically regulated at noon each day by electric impulse from some astronomical station. Although the details of the clock are rather complicated, the principle is simple. The mechanism for giving the signals shows two discs, each pierced with fourteen hundred and forty holes, arranged in spirals of twenty-four turns, with sixty holes in each turn. Small metallic pegs are inserted in the holes, corresponding to any given minute and hour, and the contact of these with an electrical conductor transmits the current for the signal. Any change in the time of starting trains is made by shifting the pegs, and one, two, three or more successive and different signals can be given for each train. It is proposed, we believe, to connect all the stations of a railroad with the main office, so that signals for starting trains will be given from a single apparatus, instead of depending upon the uncertainties of a conductor's watch.

MUCH alarm has been caused in Paris during the present season by the unusual prevalence of typhoid fever, and as a natural consequence the discussion of methods for draining the city has become more earnest than ever. It has been observed that the epidemic has been most violent in the northeastern portions of the town, and to account for this the theory has been advanced that the prevailing winds of summer and autumn being from the southwest, the air brought to the houses in the opposite quarter is more charged with the exhalations from the innumerable ventilation-pipes which discharge the vapor from the house-vaults into the upper atmosphere, and is therefore more likely to convey the germs of the disease. This explanation seems not unreasonable, and as in sewered towns this malady has been observed to affect the more elevated portions, as if the contagium floated in the lighter gases evolved from the drains, it is quite probable that in Paris, which has no sewers, as we understand them, the external air might serve as the carrier of the light organisms which are supposed to constitute the poison. Perhaps the epidemic is the natural consequence of the foul odors which have for the last two summers caused so much complaint; and even if not, the two will always be associated hereafter.

IN August last a series of experiments was made at the United States Arsenal at Watertown, Mass., at the request of the Commissioners for the erection of the Public Buildings at Philadelphia, to determine the resistance of various materials, particularly of those used in the building now in process of construction under the direction of the Commissioners. The results of the tests have been published in a small pamphlet, giving a clear and concise record of great interest. Fourteen of the determinations were of specimens of marble; twelve were of sandstone, six of limestone, and fourteen of brick. Some of the marble showed extraordinary strength, particularly that from Lee, Mass., a variety much used in Philadelphia, some pieces of which, with a sectional area of about thirty-five square inches, bore without yielding the maximum load of the great Emery testing-machine — eight hundred thousand pounds, or about twenty-three thousand pounds to the square inch. The weakest specimen of this marble tried showed an ultimate resistance of more than twenty thousand pounds to the square inch. Some limestones from Conshohocken, Pa., gave excellent results, supporting a pressure of from fourteen to more than sixteen thousand pounds to the square inch before failure; and two specimens of sandstone from Hummelstown, Pa., resisted from thirteen to nearly fourteen thousand pounds. Marble from Montgomery County, Pa., failed at ten thousand pounds, and various specimens of buff Ohio sandstone yielded to a pressure of four to seven thousand. The blue Ohio sandstone gave better results, sustaining eight, ten, eleven, twelve, and even sixteen thousand pounds to the square inch. The tests of brick developed a very great variation in strength, together with an irregularity of resistance, some specimens beginning to crack under a pressure less than half as great as that which finally crushed them. One specimen of hand-made hard brick from Philadelphia, although it showed signs of yielding at ninety-five hundred pounds, bore eighteen thousand six hundred and ninety before final failure; and another

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sample of the same make resisted nearly twenty-one thousand pounds, or almost as much as the strongest of the marbles. This, however, was exceptional, few of the bricks examined showing more than half this strength, and several began to yield at three or four thousand pounds.

Besides these, three specimens of cast, and three of wrought iron were tested, the result showing less difference in the strength of the two materials than we have been accustomed to suppose. The samples of cast-iron contained equal quantities of metal, but in different forms, the first being a solid cylinder, three and one-quarter inches in diameter and six inches long; while the second was a hollow cylinder six inches long and four and one-half inches in diameter, with shell about three-quarters of an inch thick; and the third was a cylinder of the same length, eight and three-quarters inches in diameter, with shell three-tenths of an inch thick. Of these three, the first bore sixty thousand, three hundred and sixty pounds to the square inch, failing with an oblique fracture, and shortening by compression and swelling in the middle to five and six-tenths inches before its final destruction. The second sample was diminished in length only two-tenths of an inch by the crushing load, yielding at something over sixty-eight thousand pounds to the square inch. The third, which had the greatest diameter and the least thickness of metal, bore seventy-nine thousand two hundred and thirty pounds, and was compressed only seven one-hundredths of an inch under this load, bursting finally with a loud report. The samples of wrought-iron tested were all pieces of rolled I-beams, varying from seven to fifteen inch, and six inches long, and obviously less suitable in form to resist compression than a transverse strain. All of them, as might be expected, failed by the buckling or splitting of the web, but the ultimate resistance per square inch of sectional area was nearly the same in all, varying from fifty-three thousand three hundred and thirty in the fifteen-inch beam to fifty-four thousand three hundred and ten in the nine-inch beam. The seven-inch beam showed a strength of fifty-four thousand two hundred and thirty pounds, varying from the nine-inch by less than one-sixtieth of one per cent, and the larger specimen would probably have reached the same limit if the power of the machine had been sufficient to apply a strain equal to that placed upon the others. The buckling of the web and flanges caused a shortening before total failure of one-sixth to six-tenths of an inch in the three specimens. Previous to the commencement of the buckling, a compression set of about six one-hundredths of an inch was observed in all.

The last week in October was signalized by the completion of the new Rathhaus of Vienna, which has been ten years in building under the direction of the Chevalier von Schmidt, one of the most distinguished architects of Austria. The inaugural banquet was given on the fifty-seventh birthday of the architect, who was entertained in the new building, by the Municipality of Vienna. The building contains five hundred rooms, and has cost twelve million florins,—about six million dollars. It is in the Gothic style, and stands very near the new Austrian Parliament Houses in the Ring-Strasse.

The contract for the projected tunnel under the St. Lawrence River at Montreal has been awarded to Mr. Rouillard, at three million, nine hundred and five thousand dollars. The tunnel is to be sixteen thousand feet long, or almost exactly three times the length of the Hudson River tunnel, and thirteen and one-third times as long as the renowned tunnel under the Thames. The greatest depth of the Montreal tunnel will be one hundred and seventy-six feet below the entrances. The Hudson tunnel is one hundred and nine feet below mean low tide at the point of greatest depression, so that the grades in it will be steeper than in its Canadian rival. The contract calls for the completion of the work in three years, a period which seems quite inadequate, unless Mr. Rouillard enjoys some unusual facilities.

Professor Putnam, of Cambridge, Mass., who spent last summer in exploring the remains of prehistoric races in America, has succeeded in collecting and transmitting to the Peabody Museum of Ethnology the contents of eighty stone tombs, of a race which once occupied the territory between the Ohio River and the Gulf of Mexico, but is now known only from its distinguishing habit as the stone-grave race. The graves from which the name is derived consist of slabs of stone, several of which are set upon edge to form the sides of the enclosure, while the top is covered with others, often in several superposed courses. The interior seems to have been carefully lined with small stones and pieces of bark, or even with skins, and small utensils were deposited with the bodies. Generally one body only is found in each grave, but some contain two or more. The pottery, of which several articles, probably containing food and water, were placed beside the bodies, is of various interesting shapes, some specimens being formed to represent animals, and others human beings. Objects believed to be dolls were found in some of the graves, besides children's playthings of other kinds.

M. Lisch, a distinguished French antiquarian and official inspector of historic monuments, announces the discovery near Poitiers, in the central part of France, of the remains of an important Gallo-Roman city. According to his letter, a temple two hundred and sixteen feet wide by three hundred and fifty feet long has been excavated, with a bath of the first class, still containing its swimming-basins, its heating-apparatus, pipes, pavements, and so on; and a theatre with a stage two hundred and seventy-seven feet across, still showing its rows of seats and passageways; and finally, several streets, with houses and shops; the whole forming, as he says, a little Pompeii in the middle of France. The sculptures found are said to be in the best style, dating probably from the second century, and many objects of iron, bronze and terra-cotta have been recovered. Poitiers has from the earliest ages been a considerable trading point, and the Roman city of Limonum, at the junction of four important roads, is undoubtedly the one which has just been brought to light.

It is always interesting to the many Americans who have enjoyed the benefit of instruction in the Ecole des Beaux-Arts at Paris to follow the fortunes of their former companions in the atelier, and this year a special interest attaches to some of the nominations. As our readers know, the first grand prize of Rome is carried off by Pierre-Joseph Esquié of Toulouse, a pupil of M. Daumet; the second prize by Joseph Abbut Tournaire of Nice, a pupil of M. André, and the third by M. Courtois-Suffit, pupil of MM. Suffit and Pascal. The Prix Deschaumes, of fifteen hundred francs in money, founded for the encouragement of young architects distinguished by their aptitude for their art is awarded to M. Julien, a pupil of the school. The prix Jary, given to the winner of the prize of Rome who, during his residence there as a protegé of the Government, shall have fulfilled all the duties imposed by the regulations, is this year assigned to M. Henri Nénot, who, as every one will remember, was also the winner of the first premium in the great competition for the monument to King Victor Emmanuel. The Prix Achille Leclère of one thousand francs, intended for the author of the best design in accordance with a special programme, is this year awarded to M. François Roux, with an honorable mention to M. Delemer, a pupil of M. André. The Prix Duc, intended to encourage the higher technical studies, is divided equally between MM. Louis Bernier and Wable. The Prix Jean Leclaire, of five hundred francs each, is awarded to M. Quatesous, pupil of M. Pascal and M. Yoon, pupil of M. André. The Prix Delauroy, of one thousand francs, which is added every year to the honors of the winner of the prize of Rome, is given to M. Esquié, and the Fondation Lusson, of five hundred francs, is similarly awarded to M. Tournaire, as winner of the second grand prize. The Prix Jean Reynaud, of ten thousand francs, which is awarded in each of the five Academies of Fine Art in succession is this year given in the department of Architecture to M. Daumet, as architect of the new Château de Chantilly. Besides the Prix Jean Leclaire, M. Quatesous has carried off the grand medal of emulation given among the pupils in each department of the Ecole des Beaux-Arts, and is also awarded the Prix Abel Blouet, given to the member of the first class who has received the most honors since his entrance into the school. Two new instructors have also been appointed in the school, one being M. Falguière, the most distinguished of modern French sculptors, and himself a winner of the prize of Rome, who is made professor of sculpture and "chef d'atelier;" and the other M. Brisse, who is made professor of mathematics.

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BUILDING SUPERINTENDENCE.—XXIV.

PART III.

WE will make our provisional plan without windows or partitions, since the latter will depend somewhat upon the distribution of the former, and these again upon the spacing of the roof-trusses, which is yet to be decided. Figure 175 shows therefore the outline of the main walls of the first story, and Figure 176 those of the second story; the tower and the other cross-wall which serves as abutment to the great arch being indicated, as well as the outline of the roof.

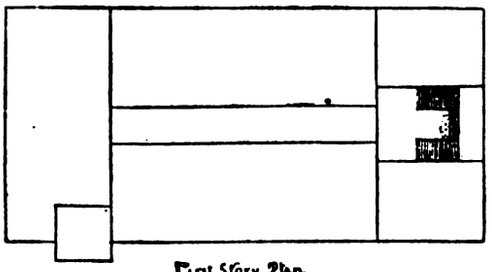

Fig 175.

As we wish, for the sake of greater security against fire, to cut off the upper portion of the stage entirely from the auditorium, by carrying the proscenium-wall through the roof, the profile of the roof will determine that of the wall, which will, however, project a foot or more beyond the slates. This being fixed, together with the heights of the various stories, we must design the proscenium opening, taking into consideration the proportions of height and width which we desire it to have, and the consequent pressure which must be resisted. This will give us the length of the cross-walls which form its abutment on each side.

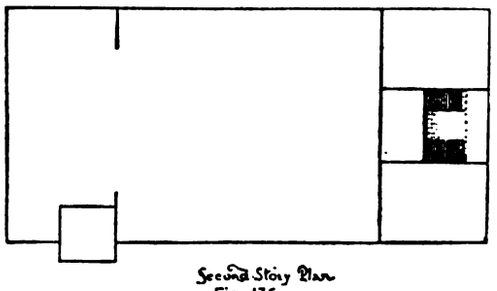

Fig. 176.

We may next study the main walls, first determining the thickness required for stability under the given conditions of height and length, and then adding to this whatever additional mass may be necessary, either in the form of extra thickness or of internal or external buttresses, to resist such horizontal thrust as may be exerted by any portion of the roofing. This will involve the consideration of the trusses for various portions of the roof, and the fixing of such forms and spacing as best meet the conditions to be fulfilled. The choice among the different modes of buttressing may depend here on the effect which we wish to secure in elevation, since so far as interior convenience or acoustic effect is concerned it makes little or no difference whether the pressure of the roof is resisted by the mass of a plain wall, by internal pilasters, external buttresses, or the weight of pinnacles.

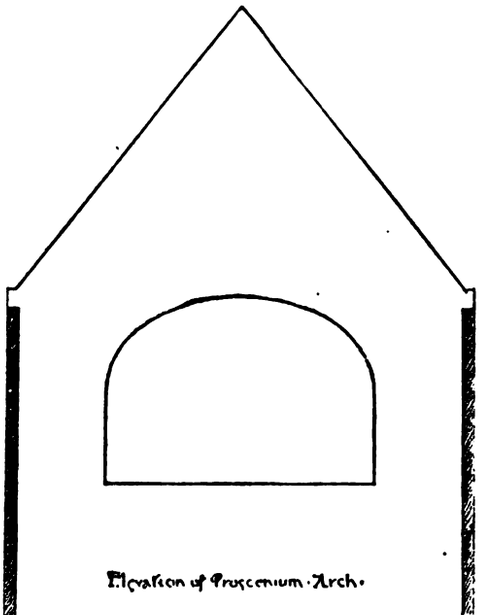

Fig. 177.

As the form of the wall above, and the distribution of the weights upon it, whatever may be its plan, must substantially determine those of the wall below it, we shall now have the main features of the exterior masonry, and can go on confidently with the study of the elevations. The thickness and position of the interior walls and piers will, however, depend somewhat on the mode of supporting the floors, and this point should be generally fixed upon at the outset, more accurate determinations being made subsequently. There is not much danger in such a building of imposing too great a crushing strain upon any of the materials, but it is best to keep the strength of brickwork and stone in mind, and to guard against diminishing unduly the size of piers between openings, either external or internal.

In order, however, that our conception of the problem to be solved may include all the essential conditions, we must, before proceeding beyond the most general outline of our design, know something of the foundation which is to support our building, and this will be all the more necessary in the present case, since the bearing stratum to which the piles are to be driven is not of very firm consistency.

If we proposed to put an unusual weight on any part of the foundation, by carrying the tower to a considerable height, or in any other way, it would be necessary, besides driving trial piles at different points within the site of the intended structure, to show the hardness of the bearing stratum, to ascertain also its thickness, and the character of the material below it, by boring through it with an auger which will bring up in its hollow a portion of the formations which it traverses, but our building being considerably lighter than others in its neighborhood, which have stood for years safely on foundations about which no special precautions were taken, we need hardly fear the disruption of the bearing stratum itself under the weight of the building, provided the load is so distributed over the piles that none of these will settle after the structure is completed. Just how much weight can safely be placed on each pile under our building cannot be known until they are actually driven, since the consistency of a bearing stratum such as we have to deal with varies greatly in different parts of a given area, but we can form an approximate opinion by observing the driving of those for works in the neighborhood. We will therefore inspect for a few minutes the operations taking place in the cellar of a new block of stores near by. The piling for one of the party-walls is just started, and we observe that the length necessary to reach the bearing stratum is about thirty-five feet. The piles are of spruce, most of them perfectly straight, although we notice some crooked ones being hastily rolled to an inconspicuous position as we approach. We see one swung under the hammer of the machine, and the driving begun. The pile sinks rapidly, and at a nearly uniform rate, through the gravel filling, until its head is within two feet of the surface of the ground, when the blows are seen to meet with greater resistance; the hammer rebounds, and the ground is felt to quiver, while the sinking of the pile under each stroke is but five or six inches, instead of a foot or so. The shaking of the ground indicates that the bearing stratum in that place is thin, and there is danger that it may be broken through, so the foreman orders a man to climb half-way up the machine and detach the hammer by hand, so as to lessen the distance through which it falls, and with it the force of its impact upon the head of the pile. Stepping up to the machine, we now ascertain the rate at which the pile sinks under the blows, by marking on one of the standards with an old nail the position of the top of the hammer after two successive blows, and measuring the distance between them. For two blows the sinking is five inches, then it falls to four, and then to three inches. The next stroke drives it three inches more, and the foreman gives the signal to stop. As the machine is being shifted to a new place we inquire the weight of the hammer, and learn that it is 1650 pounds, and we ascertain, also, that the height from the ground to the point at which it was detached for the last few blows is 15 feet. We have now the data for determining the weight which can be placed upon the head without fear of its sinking under it, by Sanders's formula,

$$\frac{F\,H}{8\,s} = W,$$

in which F = Fall of the hammer in inches.
S = Sinking at last blow in inches.
H = Weight of hammer in pounds.
W = Safe weight in pounds.

In our case $F = 180$; $H = 1650$; $S = 3$; and the formula gives $\frac{180 \times 1650}{8 \times 3} = 12375$ pounds, which is the safe weight required. The next pile, with the same fall and the same hammer, sinks only two inches at the last blow, which, if substituted in the formula, would give $\frac{180 \times 1650}{8 \times 2} = 18562.5$ pounds as the safe weight. Most of the piles, however, give a minimum sinking of three inches, further driving increasing rather than diminishing the rate, by the penetration, as the foreman informs us, of the bearing stratum; and the corresponding safe load of 12,375 pounds must be accepted for the present as the standard upon which our calculations should be based.

We notice that the piles for the party-wall are being driven in a double row, spaced two feet apart from centres in the direction transverse to the line of the wall and three feet from centres in the same direction as the wall; and, curious to learn what load the unknown builder proposes to place on them, we ask to see the plans, which are in a tool-chest on another part of the ground. These show a row of three-story stores with finished basements, each 23 feet wide from party-line to party-line. The walls scale 45 feet high from the curb-level, and we know that the depth from this level to the top of the piles must be 15 feet. As the party-walls have no pressure of earth to support, they have but two courses of stone footings; one, immediately above the piles, being 3 feet wide and 18 inches high, while the second is 2 feet wide and also 18 inches high. This is equivalent, in a rough estimation of weights, to an addition of 4 feet 6 inches to the height of the wall, which, above the footings, is of brick, 12 inches thick, making the virtual height of the wall 64 feet 6 inches. At 112 pounds to the cubic foot, which is a

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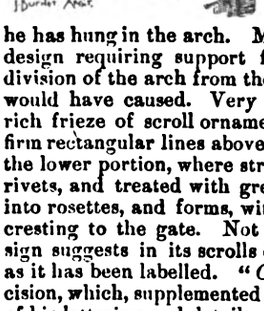
fair estimate for brickwork, but low for stone-work, the weight of each foot in length of the wall will be 7,224 pounds. To this must be added the weight of the floors and roof and the probable loads upon them, which in a retail country store may safely be taken at 100 pounds to the square foot. The roof, which in this case is covered with tar and gravel, will require about the same allowance. The clear span of the floors is 22 feet, and the party-wall supports half the floor on each side of it, or 22 feet in all. Counting that of the basement, which is framed just like the others, there are four floors besides the roof, and the total floor and roof load supported by each foot in length of the party-wall will therefore be $5 \times 22 \times 100 = 11000$ pounds. The weight of each foot of the wall itself, as we just ascertained, is 7224 pounds, so that the total pressure at the bottom of the wall is 18224 pounds to each foot in length. The piles being spaced 2 feet apart transversely, and 3 feet longitudinally, there are but two piles under every 3 feet in length of the wall; so that each pair of piles has to support $3 \times 18224 = 54672$ pounds of wall and floor load, making 27336 pounds to each pile.

But we have ascertained by Sanders's formula that the safe weight upon the piles under the conditions which we find to exist is but 12,375 pounds; so that if the plans are carried out they will be loaded to more than double their safe capacity. After satisfying ourselves that our calculations are correct, we call the attention of the foreman of the pile-drivers to them. He shrugs his shoulders at first, and mutters something about "book-larnin," and "practical men," but is finally brought to admit that if the building had been his, he would, considering the softness of the ground, have put a triple instead of a double row of piles under the wall, and made the spacing in each direction 2 feet, which is as near together as long piles can be driven without danger that they may force each other up from their solid bed on the bearing stratum. This would give 3 piles for the support of every 2 feet of wall, and would bring the load on each within the safe limit. "However," the foreman adds, in a burst of confidence, "I aint got nothin' to do with that. They give me the piling plans, and I go by 'em; and anyhow, I guess these are only speculation buildin's." That they are likely in this case to fulfil the condition required of them — to hold themselves up until they are sold—we cannot deny, and we forbear to meddle further with what is clearly not our business.

Nevertheless, we should be sorry to run the risk of seeing in our own building after a few years the evidences of incipient settlement, the joints of the brickwork opening, and the lintels and interior plastering cracking; and we resolve to keep the weights on the piles within the safe limits.

AMERICAN ARCHITECT COMPETITION. — IRON-WORK.



"*Cross Keys*" stands brilliantly first in this competition with a gate in which he has developed with ingenuity and graceful fancy the characteristic qualities of wrought-iron. His use of this metal is as logical as it is elegant in design, and both in mass and detail shows a fine artistic sense. This quality is conspicuous in his promptly taking advantage of a rare opportunity for a pendant ornament; no device could be more appropriate than the ingenious net-work of rings which he has hung in the arch. Manifestly, this is more logical than any design requiring support from beneath, besides avoiding a rigid division of the arch from the gateway, which such a band of support would have caused. Very admirable, too, is the way in which the rich frieze of scroll ornament across the gate is contrasted with the firm rectangular lines above and below it. Of this rectangular work the lower portion, where strength is required, is closely studded with rivets, and treated with great vigor, while the upper part blossoms into rosettes, and forms, with the spear-heads, a light and graceful cresting to the gate. Not so successful is the knocker, for its design suggests in its scrolls of foliage, wrought, instead of cast iron, as it has been labelled. "*Cross Keys*" draws with a sparkling precision, which, supplemented by an orderly and intelligent disposition of his lettering and details, makes his a model sheet.

"*Art Lover*" gives a gate in which wrought-iron is used with great simplicity. His free use of plain bars of iron to frame his double row of scroll ornament gives the latter peculiar richness, and yet possesses a thoroughly constructional character. The twisted spiral of the double bars is a legitimate and effective device. The same may be said of the riveted lattice barring the lower part of the gate, and below that the introduction of sheet-iron brings in an element of which "*Cross Keys*," in common with several other competitors, did not avail themselves. The composition of the foliated work is unnecessarily confused, and its stability not materially increased by the segmental bars riveted across it. The chief blemish in this design, however, is the unfortunate introduction of the iron spindles in the upper part of the gate. Iron lathes may be turned, no doubt, by powerful machinery, but this sort of work is so easily and naturally done in wood, that turned spindles necessarily recall that material and their introduction here is a surprising error in so good a design. The design for a sewing-machine stand is more logical than graceful.

The merit of "*Two A.M.'s*" gateway lies in the happy device by which he spans it with clustered bars richly bound together, and developing midway into an ingenious support for a lantern. The development of the bars and scrolls is simple and natural, and the result effective. The intention shown in trying to give the iron-work a firm attachment to the stone posts is more commendable than the means actually employed, which are too stiff and formal to harmonize with the florid work elsewhere. The same system of twining rope-like bands is used in the gate itself, the design of which lacks somewhat concentration of interest, and its real richness is dissipated, without producing the effect it might. The design submitted for a cast-iron window-frame is neither decorative nor suitable to the material. The distinction between cast iron and wrought does not consist in the former being poorer and less florid than wrought-iron, but in its being a moulded substance instead of a beaten one. An ornamentation appropriate to a moulded surface is then its natural characteristic. We notice, however, that several of the ablest competitors have made between the two materials an evident distinction in favor of florid work in wrought-iron, whereas castings can be easily treated with the greatest richness. "*Two A.M.*" draws with ragged, heavy lines, which do not do justice to his carefully-considered details.

"*Ferrum's*" sheet is a most interesting one. While not altogether fortunate in his details, which are not very decorative, the designer's individuality is so marked, and his intention so positive, and carried out with such directness, that he at once secures a high position among the competitors. He presents us with a design for a gallery, whose railing suggests the balconies common in Spain. Cast, wrought, and sheet iron are thoughtfully combined with a view rather to economy and practical considerations, than to an artistic design; but the general result is successful, and certainly it is far removed from being commonplace. There is a decided lack of brace or tie to hold together the gallery-bars near their bases, and the use of wrought-iron in such broad brackets as those indicated is not to be commended. These brackets should have been, while keeping the same profile, divided into several narrow ones, which would have been more easily hammered out, and would have produced a lighter and more decorative effect. The wrought *grille* is thoroughly constructive, and produces a good effect with the simplest means. The drawings are coarsely and heavily executed; and the design for the knocker suffers especially from this.

"*Vulcano*" introduces wrought, cast, and sheet iron in his gate. All the bars being wrought, the cresting and foliation are of cast-iron, and the perforated panels of sheet-metal. The latter in panels gives value to the rich crestings. Here we finally come to a design where something is shown of the real capabilities of cast-iron for rich effects. It was, however, a mistake to make so heavy a cresting, and the general design suffers from the lack of some dominant feature. It would, for instance, have greatly improved the design to have given greater height to the twisted bars, which with the foliated work above should be the dominant feature. The result of such a change is evident in the wall-railing, whose judicious proportions produce a rich and agreeable effect. It would have been more satisfactory to have emphasized more decidedly the staple securing the gate to the stone post; for the former now has no recognized position. The design for a wrought-iron grate is graceful and well in the character of the metal.

"*Maréchal*" gives us a gate of excellent proportions, and with a well-expressed intention. He concentrates his ornamentation upon the lateral divisions, and crowns each half of the gate with a rich feature rising towards the common centre of the double gates. This latter feature is an unfortunate device, for by reversing the natural line of a supporting member sloping down from the pivoted side, it not only loses leverage to swing the gate, but it brings an unnecessary weight just where it will increase any tendency to sag. This crowning motive is also ill-considered in its treatment of cast-iron, which, if the lettering is correct, provides for that metal a design which would be peculiarly appropriate, both in its movement and its slender scrolls, to wrought-iron. It would be difficult to cast so delicate a pattern, for it must be borne in mind that this metal does not easily run in narrow channels, where a mere air-bubble will stop its course. The wrought portion, however, is designed with grace and ingenuity, and the sheet-iron, with its *repoussé* bosses, is well placed. The study for the *grille* is admirable, the ornamentation well distributed, and the details interesting. Had "*Maréchal*" given us a good study of cast-iron he would have taken a higher rank, for his drawings show unusual delicacy and refinement.

It seems as if the competitors were strongly partisan each of one of the metals, and either did not understand or would not give their attention to the other metal. Thus: "*W. J.*" develops with success cast-iron, but except in bars does not give wrought-iron its characteristic forms. His design for a wrought-iron gate could be easily cast; much of it, indeed, could be reproduced most easily in that way. On the other hand, his gate in cast-iron is an excellent example of its legitimate possibilities, though in the mere matter of proportions the other example is the most successful. The cast-iron staircase is intelligently considered, and the alternative in wrought work promises well. The drawings are skilfully presented, and as he is a facile designer and well up in cast-iron, we have only to recommend to "*W. J.*" careful study of mediæval wrought-iron.

"*Vienne*" treats a railing of wrought-iron with forms which are characteristic enough, but which lack elegance, the lower com-

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partment being particularly clumsy. His cast knocker is, however, elegant in mass and detail, and shows its material to advantage. The great disparity between the two examples may perhaps have come from the designer having inspired himself with some ancient wrought-iron designs which were poor examples, for undoubtedly many such exist, and, when we recommend the study of mediæval work, we refer only to good examples of it. A village blacksmith might well understand the capabilities of his materials without having any knowledge of the principles of design.

This caution applies also to "*By George*" — and there is greater need for it — who gives us a staircase which he intends shall be original, cost what it may, and if he had anything to lose, it would certainly cost him that. His very positive knowledge of the properties of iron ingeniously applied is vitiated by a hopeless want of taste. A "Staircase to a Family Hotel" is not the place to exhibit a procession of ill-drawn snakes, beasts and birds, nor is a "Fence in front of a City-House" a fit opportunity for grotesque vegetables. We suggest to "*By George*," that since he thoroughly understands the proper practical use of iron, he now apply himself to the acquisition of the elements of design, and to the improvement of his taste. "*Oriental*" comes before us with a careful study for a cast-iron lamp-post, and a wrought-iron railing. The former is well designed for its function and for the material, and shows unusually refined details. The wrought lantern is simple and graceful. The railing though less artistic is not without ingenuity, especially in the device by which the railing is attached to the posts. The drawing is neat and attractive.

What "*Tyro*" sends is so good in its way that we regret the modesty of his small sheet. His wrought gates are thoughtfully considered and produce a dignified result. He uses sheet-iron effectively in the panels of the lower half of the gate. His lamp-post of cast and wrought iron is not so pleasing, but has some good points. The drawing is done with care.

"*Shanks*" tells us his lantern is of cast-iron and his railing wrought, but he makes no intelligible difference in their treatment. There is nothing about the lantern which would not more naturally be executed in wrought-iron, and it would never occur to any one to try to cast it. As wrought work, both designs are commendable.

"*Serio*" is industrious and ingenious. He offers us seven designs of iron *grilles*, some of which he condemns himself by labelling them "wrought or cast iron." If they are suitable for one metal, they lose their merit for the other. In truth, they are all adapted only for wrought work; he gives us, however, a hot-air register suitable for casting. His drawing is careful rather than brilliant.

"*All Right*" also gives us a cast-iron register, but it is of a most primitive pattern. On the other hand his wrought-iron door is of unusual interest from its novelty, yet it escapes the reproach of eccentricity. The sheet and wrought work are admirably combined, and we regret that the author did not send us a more elaborate and ambitious attempt.

"*Thor's*" wrought-iron hinge would cast well. He should have given it more delicate detail to bring out the resources of the hammer. The cast-iron railing could be cast, but we should advise "*Thor*" not to do so until he has given more attention to design, and then we are sure he will substitute something better in proportion and detail.

HENRY VAN BRUNT,
EUGENE LETANG,
ARTHUR ROTCH.

BUILDERS' SCAFFOLDING. — VII.

BRACKET-scaffolds, used by carpenters and joiners, and for outside plastering, stuccoing, and for such other light work, are usually of two kinds, represented in Figures 18 and 19. The bracket is of triangular form; the horizontal and vertical parts are usually of 2″ x 4″, or 2″ x 6″ stuff; the oblique pieces or struts are of fencing or are 2″ x 4″; all the pieces are securely nailed or screwed together; and gusset-pieces of board are nailed across the right angle. Figure 18 is supported at the required height against a wall by means of a raking shore, the head of which presses up at the right angle, and is confined by the gusset-pieces. The foot of the shore is shod with iron, and is sunk in the ground to prevent slipping. Sometimes an adjustable shore is employed, consisting of two pieces of long scantling, of size to resist the transverse action of the oblique strains which may come upon it when extended to its full length. At one end of one of the pieces is a rod-iron jointed clasp which fits obliquely over the other piece and fits into corresponding notches in it, and at the corresponding end of the other piece is a fixed band-iron clasp which holds both pieces together, and permits them to slide upon each other, the oblique clasp catching fast hold of the notches, so that the pieces can be secured together at any required length. A wall board is usually nailed horizontally across the back or vertical piece to prevent swinging sideways. As the prop frequently has to be of considerable length to reach the height at which the bracket may be required, care must be taken that the prop has enough sectional area rightly disposed to prevent its bending in the least degree under the heaviest loading to be imposed upon the scaffold.

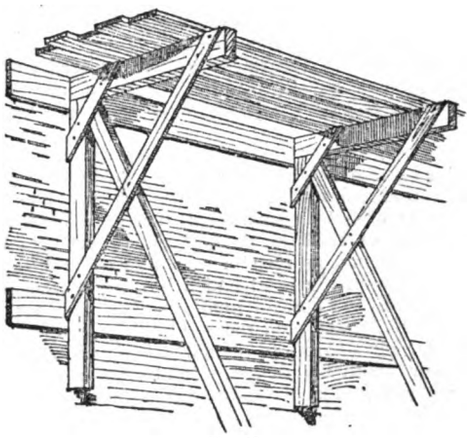

Fig. 18.

The bracket in Figure 19 can only be used through an opening; it is held by an upright scantling, to which it is spiked; the scantling is spiked directly to the joists above and below when they lie transversely of the wall, or indirectly, to scantlings or cleats which are nailed to the joists, when they lie longitudinally of the wall. The cleats are sometimes spiked to the joists above and below on the corresponding opposite sides of the upright scantling, so as to resist the alternate strains of *pull* above and *push* below. Brackets of this kind usually consist simply of waste boards nailed to the upright scantling.

Bracket-scaffolds are sometimes hung on iron pins with heads driven in brick or stone walls, for purposes of outside plastering, stuccoing, etc. In Scotland a hard-wood needle, as it is called, with notched head about three inches square, is let into the wall, a corresponding square hole is cut in the upper part of the back-board of bracket, which is usually a piece of 8-inch plank laid flat against the wall, so that it can slip over the notch.

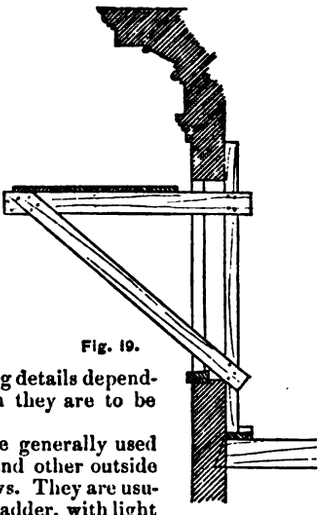

Fig. 19.

There are various forms of brackets for scaffolds adapted to special purposes, but all depend for their utility upon one or another of the methods of securing in position to the building here described, or others which are analagous in principle, but of varying details depending on the circumstances in which they are to be used.

Hung or suspended scaffolds are generally used by painters in painting cornices and other outside work not accessible through windows. They are usually made in the form of a runged ladder, with light boards laid across the rungs. Bridle suspending-ropes are attached at both ends and on each side; to the bridle-ropes purchase-blocks are hooked. The upper block is made fast to a large bar-iron hook, which is fitted with a jointed bearing-plate, by which it is suspended. It is made large enough to reach back over the tops of ordinary house cornices. This arrangement of scaffold is shown in Figure 20. In the absence of these hooks, cantilevers made of strong planks or spars are laid upon the roof, with the ends projecting over the cornice, and weighted at the inner ends, the hoisting-tackle being fastened to the projecting end, the fall of the hoisting-rope reaching down to the painters using the scaffold. The cantilever is a straight lever of the first order, with the fulcrum between the power (which in this instance we will consider to be the projecting end which suspends the scaffold with the painters, etc., upon it) and the weight, which is the inner end which is weighted down upon the roof.

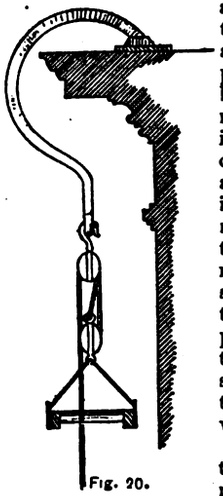

Fig. 20.

Paris painters sometimes use for painting the outside work of windows, etc., an arrangement of somewhat similar construction to what is called the "boatswain's chair," which is used on board of ships for facilitating the scraping or varnishing of masts. The ordinary boatswain's chair consists of three pieces of light scantling, about two feet long and having holes in both ends, fastened together in a triangular (equilateral) form, and suspended by a bridle-rope fastened to the three corners by passing through the holes and knotted underneath. A seat is formed by canvas or netting stretched across the triangular frame, but often it is used without any such

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seat. For house painting it is slung from a cantilever to which a block is fastened, the fall of the rope being fastened by the operator in the chair to the suspending-rope.

Paper-hangers' scaffolds consist of a double ladder, each part widening towards the bottom. The parts are hinged together at the top, and when set up for use they spread apart at the bottom to an extent limited by the position of the hinge, which checks it at a convenient angle of inclination. Each fold of the ladder has rungs alternating with the other at convenient intervals, to suit a variety of heights. Boards or planks are laid across the rungs of two or more such ladders at any height required.

Plasterers' scaffolds in ordinary house plastering are usually erected upon trestles of suitable heights, each locality having sets of trestles suited to the ruling average heights of its stories. These trestles are usually made of lighter scantlings than those for masonry purposes seen in Figure 13, although higher and longer, and instead of having strut-bracing, as seen in that figure, have the cross or panel bracing between the head and a horizontal tie-rail near the foot of the legs. In the case of high stories, or the ceilings and walls of public buildings, etc., the scaffolding is usually erected on standards of light scantlings, regularly disposed in tiers at proper intervals apart, both longitudinally and transversely of the hall or auditorium, the standards being braced both longitudinally and transversely by systems of diagonal panel-bracing between successive tiers of ledger-rails, in the intervals between the standards, both longitudinally and transversely. The rails are introduced at such intervals in the longitudinal and transverse directions as the height of scaffold and the distance apart of the standards require. When a considerable length of high ceiling has to be done, it is sometimes advisable to construct a movable scaffold which allows of work on a convenient extent of the length, and usually all the width at a time. It is made to roll along on wheels working on light railways. Such a structure is simply a limited arrangement of braced standards, etc., corresponding to the preceding description, with the addition of wheels under the standards in suitable positions.

Elevated scaffolds, such as are required for spires, turrets, finials, prominent chimneys not accessible from a roof, and such like portions of structures, which have considerable altitude from the ground, only differ from the types already described, perhaps, in their manner of support, which for economical reasons in many cases is not carried up directly from the ground, but rests upon the substructure. Many, if not all of the types of ledger-scaffolds are available for the purpose and are adopted according to the prevailing methods which may be, as it were, indigenous to the locality, and the methods of supporting them, when not by direct standards reaching to the ground, floor-joists, roof-timbers, etc., partake of the cantilever or bracket types, according as magnitude and other determining circumstances seem to demand, regard being had to the nature of the supply of fitting materials and appliances which are accessible and economical for the purpose, the particular method adopted in any instance being also regulated by the local prejudices and predilections of the builder. Such scaffolding may be required for either building, rebuilding, or for subsequent additions or repair. In the case of spires of lofty dimensions, when constructed of stone, standards are generally carried up directly from the ground (assuming that the scaffold of the tower substructure had previously been removed) to any convenient height above the tower, and at a convenient distance out from the tower wall. These standards may be of timbers or of several scantlings bolted together with continuous ledgers and panel-bracing all around, as described in the fifth paper. To the standards are attached strong timber needles, which run horizontally through the louvre or window openings, and are propped up vertically, and strutted from the sills of the openings. These needles carry an inner tier of vertical standards, which are placed close in to the tower wall and have ledgers at suitable intervals, and panel-bracing in these intervals all around, between the consecutive tiers of ledgers. Raking wind-braces are carried from convenient heights up the upper tier of standards down to the main or lower standards at the level of the upper tier of ledger ties, so as to impart the necessary resistance to the wind-strains acting upon the upper scaffolding. As ordinarily the spire contracts as it ascends, more space is left higher up for interior bracing and reinforcing devices, to add to the stability of the scaffold when not interfered with by architectural features or details, which in ordinary cases may afford the necessary lateral stiffness to the scaffold when not in a very exposed situation; but when a high spire is contemplated, and is in an exposed locality, flying wind-braces must be resorted to, as the wind-strains on the scaffold should not cause any lateral strain to be communicated to the spire.

Scaffolding for the erection of factory or chimney stacks (called *stalks* in Scotland) is most generally constructed on the inside; however, for small chimneys which would not afford convenient working room inside, it must necessarily be outside, and usually is a double-faced ledger scaffold, although occasionally it is single-faced, as described in the November number; but in either case the scaffolding should be rendered independent of the chimney, by means of a rigid system of longitudinal and transverse cross-bracing in panels or bays, as well as shoring for the single-faced scaffold, all around; the working-platform being supported in the latter kind on triangular brackets nailed to the standards, in order that whichever kind is employed, putlog-holes in the chimney shall be avoided, with a view to the scaffolding in no way interfering with the independent equal settlement of the chimney all around. For the inside scaffold the number of putlogs or needles of, say, 8-inch plank, depends on the internal diameter and whether the hoist is placed inside or outside. If outside, there is usually one placed in the centre, and one on each side of it; they have a bearing of 3 or 4 inches on the walls, a brick is left out at the back of each end, so that they can be moved backwards or forwards lengthwise in this vacancy, in order to be readily withdrawn endwise and gradually slipped out. When the hoist is placed outside, the putlogs below the working-platform are often left in until the top is reached, when all are taken down at the same time; in the meantime, they afford convenient holdings for temporary ladders, by which the bricklayers ascend to their work. Planks are laid close together across the putlogs, and form the working-platform; it covers the entire opening, except when the internal diameter is large enough to admit of the hoist-hole being placed in the centre of the working-platform, through which the materials are raised to the bricklayers. Scotch builders in the majority of chimneys prefer to put the hoist or gin-pole on the outside, except when the diameter is very large, and affords a roomy platform around the central hoist-opening. This hoist usually consists of a vertical pole 5 or 6 inches in diameter, and about 12 feet long, having an iron ring or collar on each end, and another about 3 feet from the lower end; but it should correspond with a certain number of courses of the brick being used so that it may work conveniently with the successive scaffolds; the lower end has a groove across the centre to admit of the collar fitting down into a ratchet or notched iron anchor. This anchor is of ½″ x 2″ bar-iron about 4 feet long; about 18 inches of one end is twisted round one-quarter turn, the extreme 7 or 8 inches of the twisted part is notched closely about half-an-inch deep, along one edge, the other end of the anchor has nail-holes punched in it. This anchor is laid in the wall dry as it is being built, in the direction of the diameter of the chimney, with the notched end projecting about 5 or 6 inches from the outside face of the wall, with the notches placed edgewise upwards. The inner end of the anchor is nailed through the holes to the central needle, which is placed above and in contact with it. A second similar anchor is laid in the same manner, about three feet above the lower one as just described, as the wall is being built, the height corresponding with the middle ring or collar on the pole, which has attached to it a notched bar, fixed crosswise of the pole to fit into the notches in the upper anchor, so that should the anchors not be exactly plumb over each other, the pole by means of the two notched bars square to each other can be *trued* plumb, and so held there. A spindle of ¾-inch round iron is driven into the upper end of the pole; fitting on this is a cross-arm of about 2 feet 6 inches long, which swivels around, and having a sheave working in a slot in each end; the hoisting-rope passes over these sheaves, and as the materials are hoisted to the top, the arm swivels round to enable the box to be dumped on the scaffold inside. When the wall has reached about 3 feet higher, another iron anchor is inserted to serve its turn when the wall again reaches the proper height for still another. When the lower anchor is relieved of the pole as it is raised each stage, it is withdrawn, to be reset further up; thus, three anchors are constantly required to relieve each other in turn as the wall advances. A pulley is secured at the foot of the chimney, through which the fall of the hoist-rope passes horizontally to the winch. In England it is usually preferred to use an inside hoist. A good form of it consists of a tripod set over the centre of the chimney. It is composed of three iron rods, having an eye at the top through which a bolt passes securing them together; from this bolt is suspended the hoisting sheave or pulley. The building materials are hoisted in a box of about 20 to 24 inches cubic dimensions. A square opening is made in the centre of the working-platforms to pass the box through. The lower ends of the tripod legs are bent and flattened, and a pin-hole made in them by which they can be fastened to the working-platform. When the inside hoist is used, either two or four putlogs are necessary, one on each side of the centre space being set to mark the size of the hoist-opening. The lower putlogs must be removed at once, in order to leave the entire height clear of obstructions, so as to admit of the hoisting being done without any interruption.

FILLING THE PORES OF WOOD.

STAINED or painted wood-work is finally submitted to the various treatments known as polishing, rubbing (with wax), or lacquering or japanning. Those processes are intended, on the one hand, to beautify the work or to give lustre to it, and, on the other, to protect its surface against exterior injurious influences, consequently to impart to it greater durability. By closing the pores of the wood it becomes smoother, and is capable of greater resistance. Very much depends upon an efficient closure of the pores, also upon the operation being effected with the proper substances. The latter should harden within a few hours, and should not undergo any changes from exterior influences during their transformation which might have injurious effects upon the layer of polish, lacquer or wax. Although

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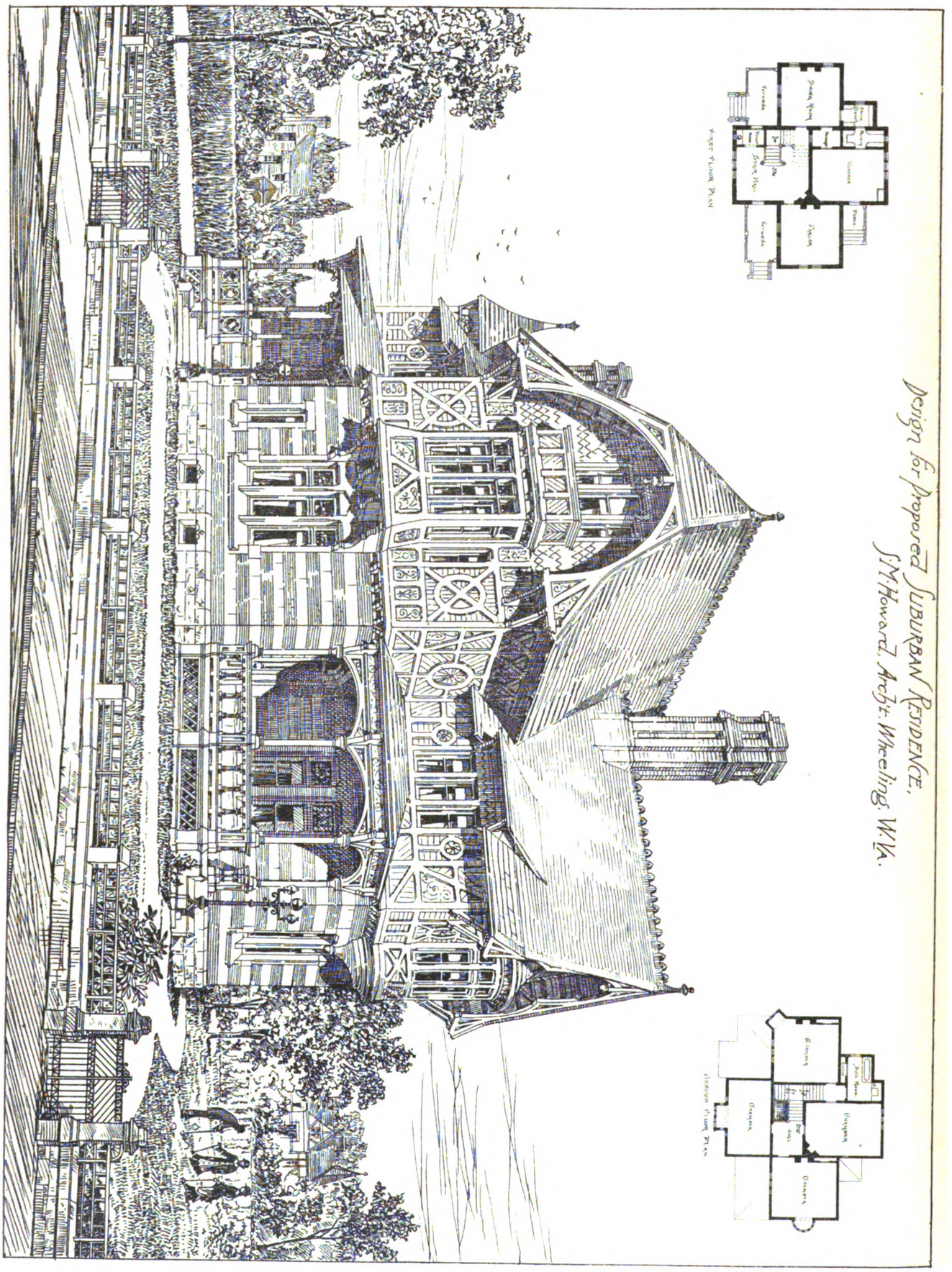

Design for Proposed Suburban Residence.
S. M. Howard, Archt. Wheeling, W. Va.

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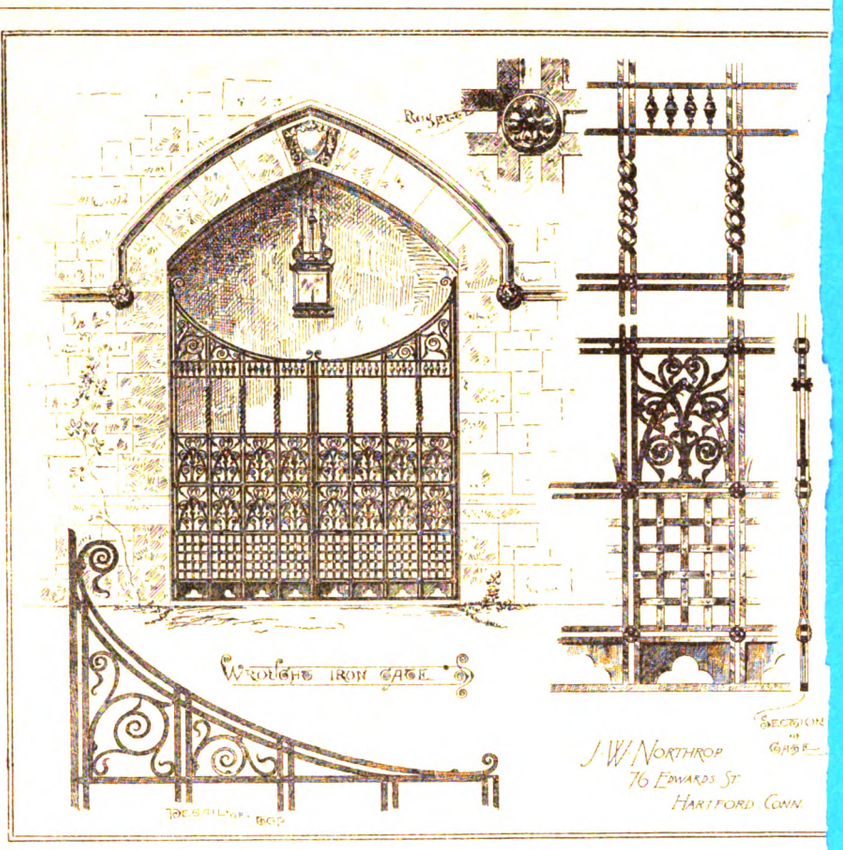

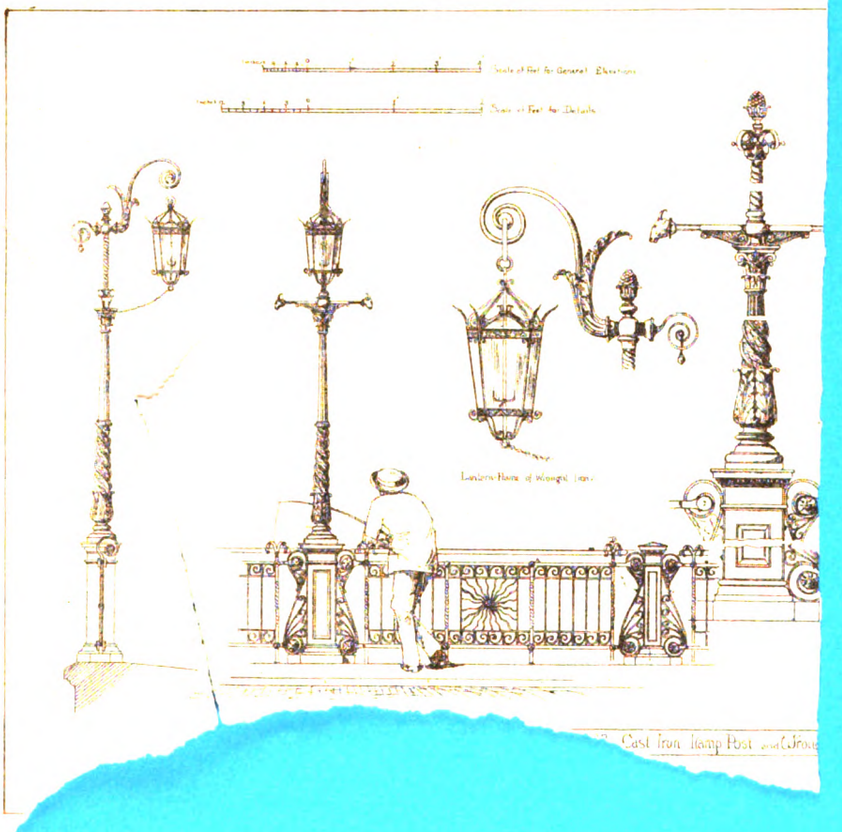

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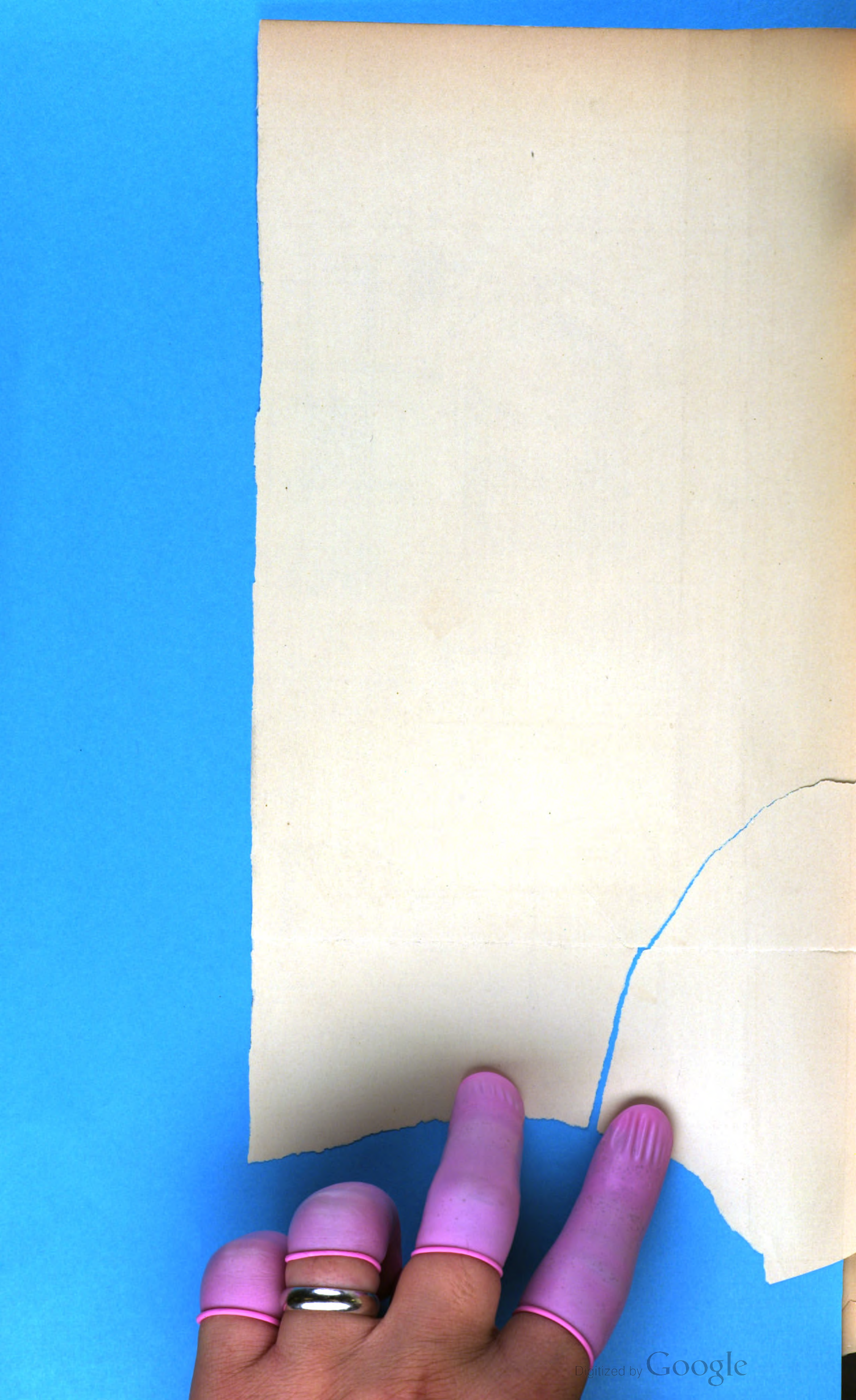
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PIGEON HOUSE

At Oceanic, N.J. for Dr. H.E. Owen

Charles I. Berg *Architect* New York

Heliotype Printing Co. 211 Devonshire St. Boston.

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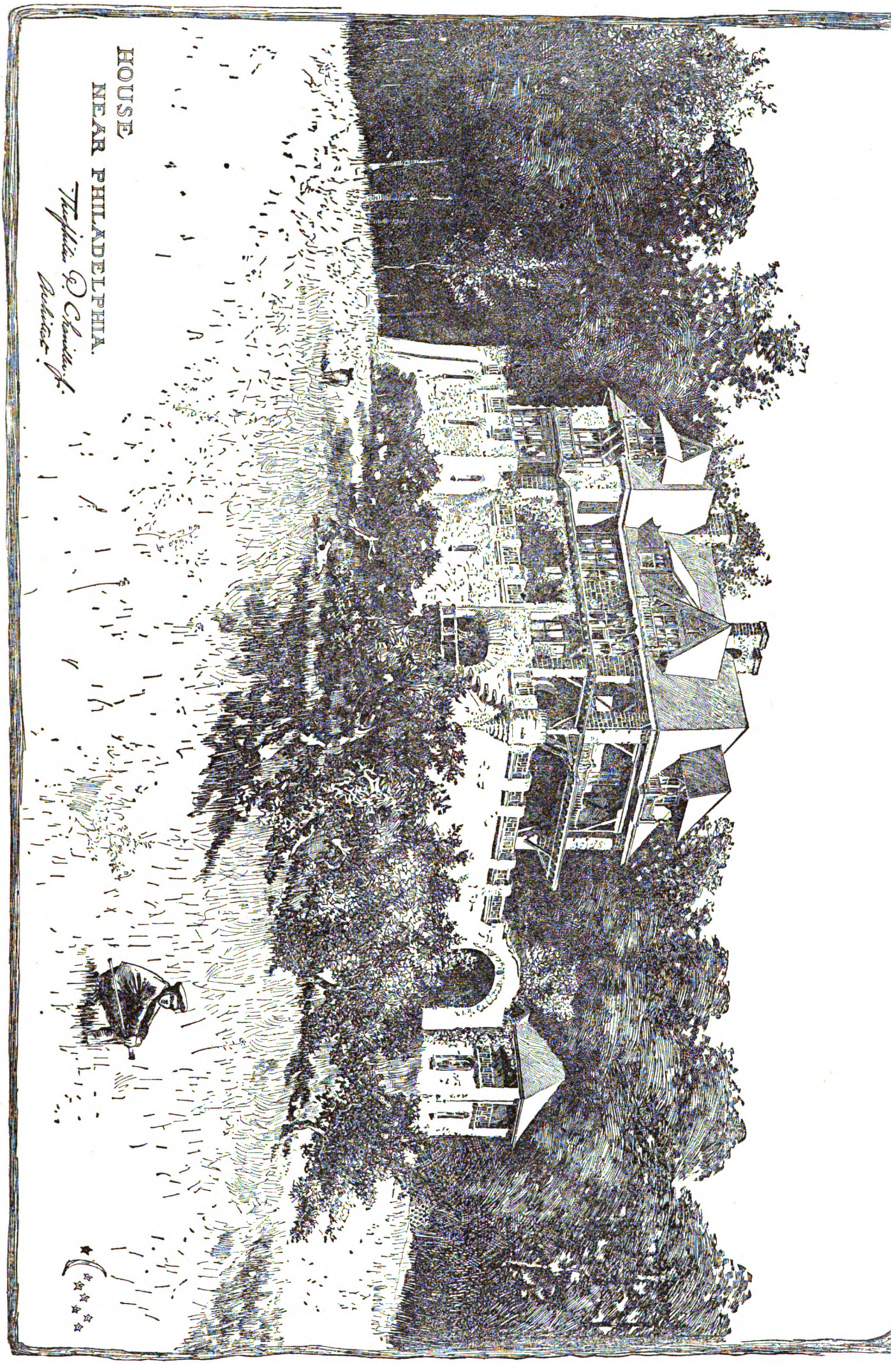

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in recent times means have been placed at the disposal of the workman which meet all these evils, in nearly every one of our joinery and cabinet-making shops the old method of filling the pores — smoothing or polishing with linseed-oil and pumice-stone — is still practised. Our joiners and cabinet-makers of the old school will have nothing to do with newer methods, because their shops are worked on the old system of smoothing with oil; it is said that the wood becomes brighter through the oil entering it, and the system permits them to dispense with the more elaborate treatment with plane, scraper, glass-paper, and Dutch rush, which is indispensable in the methods of filling the pores, as described below, and which we copy from an article on the subject in the *Deutsche Tischler-Zeitung*.

The writer of the paper, Herr L. E. Andés, of Vienna, admits that as regards the polish of the obtained surface, smoothing with oil has the advantage. On the other hand, it is a well-known fact that work thus prepared loses in appearance in a very short time by the sweating of the oil. The outside smooth surface becomes rough and dead, loses its polish, the percolating, not yet dried, and consequently still sticky oil absorbs dust, and the furniture, etc., loses in color, and a repetition of the polishing process becomes necessary. As a matter of fact, the sweating of the oil cannot be prevented by this method, for the fine particles of pumice-stone which, mixed with the oil, fill up the pores of the wood, retain the fat substance. The wood itself has eagerly absorbed all the oil, its cells are deeply filled with it; and when the linseed-oil, if exposed to the influence of the air, dries only after six to eight days, it is quite out of the question to speak of a solidification of the whole. Now, it is generally the custom to begin with polishing directly after smoothing. Thus we apply the polish upon a surface not yet dry, polish it, and only then, when this latter operation is completed, we give to the oil, which now is no longer in contact with the air, an opportunity for drying, by standing in a warm room, etc.; but in course of time, the oil below the layer of shellac begins to dry up without exposure to heat; the shellac layer is torn into numerous fine cracks and turns rough, while at the same time the fine particles of pumice-stone are beginning to come out. The still sticky oil absorbs all dust, the pumice-stone particles become more prominent, and we have, as the result, instead of the desired shining surface which should remain smooth, a rough, dirty crust, which disfigures our furniture.

The durability of the lustre and the smooth surface can be guaranteed only if the wood, after smoothing with oil, is left for six months before being polished. By that time the putty formed of the pumice-stone and linseed-oil is perfectly dried up, and the polish then applied is lasting, and the sweating of the oil prevented. But as, under present conditions, it is almost impossible to let work stand so long, it is highly desirable that means should be found by which we might be able to dispense with oil altogether. Herr Louis Köhler, of Geissen, suggests the following method: — "Polishing is still the same operation that it was one hundred years ago. The polish has also remained the same, without essential improvement. And yet the whole process is very faulty and imperfect, and as long as it is pursued, the exudation of the oil and the deadening of the best work cannot be avoided. If no oil is to sweat out of the wood, none must be put in; the latter, however, is done on a large scale with the old procedure, consequently the work is spoiled. Now instead of smoothing the wood with oil and pumice-stone, it is only necessary, after the piece of work is completely finished, to put on the lacquer with a so-called badger brush. This is done quickly because the lacquer (a spirit-lac) dries at once. Successive coats of lac are applied until a so-called ground is obtained. Porous woods, of course, require more lacquering than close-grained kinds. If the work is well performed, the whole is now smoothed with fine pumice-stone, rottenstone, or hartshorn. The polishing is proceeded with, but without oil, only a little of the latter being used for finishing."

This procedure effects one thing. The pores are completely sealed up with shellac, and as no oil can enter, none can exude in course of time. Spirit-lac, however, is expensive, and we must therefore try to employ other materials which close the pores of wood by a simple and cheap process. This may be attained by sizing with glue-water, by coating with starch-paste, or by filling the pores of the wood by the American method, with "wood-filler." By either of the three methods the pores of the wood are completely filled, and as no oil enters the wood, none can come out afterwards. Sizing with glue-water is almost exclusively employed for soft woods, the size being applied three or four times with a brush. After drying, raised fibres of the wood are rubbed off with fine glass-paper, and the polishing or japanning is proceeded with in the usual manner. Coating with starch-paste is much more advantageous than sizing, starch once dried being perfectly impervious to exterior influences. A moderately thick paste is prepared by pouring and stirring in boiling water a dough made of powdered starch and cold water. The wood is coated as required with a brush, and then treated as usual.

The most perfect process of filling the pores of wood has come to us from America. At the Philadelphia Exhibition of 1876 articles of wood were shown for the first time, the almost startling smoothness and high lustre of which astonished all experts, the latter properties being enhanced by the contrast supplied by objects, japanned and polished in the usual manner, exhibited by the side of them. The procedure by which this extraordinary smoothness and, at the same time, extremely small consumption of polish or lacquer are attained is a very simple one, and is based upon a mechanical closing of the pores of the wood by a composition of certain ingredients, hitherto the property of the inventor. This composition, termed "wood-filler," is supplied in closed tins, as a thick, sticky mass, and in applying it the quantity to be used is thinned to the consistency of ordinary varnish by adding good turpentine. The mass thus prepared is put onto the finished wood-work with a moderately stiff brush, and left to coagulate. When this coating, from a shiny appearance, becomes dull, the mass is rubbed across the grain of the wood and well into it with a handful of wood-shavings or a suitable piece of wood, at the smooth bottom of which a piece of stout leather has been fastened. Care must be taken that everything on the wood is rubbed clean off, only the "filler" remaining in the pores. The wood thus prepared is left to dry for the space of eight hours, this being quite long enough to harden the filler. The latter is also said to act as a preservative of the wood, as it is not attacked by the influence of the atmosphere, nor by chemicals. After the hardening of the filler, the wood is once more well rubbed with glass-paper, and the polishing or lacquering may be at once proceeded with. Less polish, time, and labor are said to be required than with the usual method; no sweating of oil takes place, as none has been absorbed by the wood. The lustre is, at the same time, most remarkable; there is a glassy surface; and its durability is stated to be unlimited.

The American wood-filler is supplied in two colors, — white for light woods, brown for dark woods. Any shade may be produced by a corresponding blending of the two. The white wood-filler consists of one part by weight of pulverized starch, one part of barytes, and one-sixth part of dryer; the dark filler of the same materials, with the addition of one-half part of brown. The finely-ground dry substances are well mixed with the dryer, rubbed down fine in a color-braying machine, and are now — thinned with turpentine — ready for application as "wood-filler." — *The Builder*.

THE ILLUSTRATIONS.

COMPETITIVE DESIGNS FOR IRON-WORK. — AMERICAN ARCHITECT COMPETITION.

With this number we publish all of the designs meriting publication which were submitted in the recent competition. The subject of the design was left to the competitors, the only requirement being that the designs should represent some articles executable in wrought and cast iron. As already stated, the five equal prizes have been awarded to Mr. J. W. H. Watts, Ottawa, Can.; Mr. J. W. Northrop, Hartford, Conn.; Mr. B. M. Lincoln, Hartford, Conn.; Mr. W. C. Hazlett, New York, N. Y., and Mr. C. H. Rau, Rochester, N. Y. The designs of the other authors are published over their *noms de plume* only.

DESIGN FOR A SUBURBAN RESIDENCE. MR. S. M. HOWARD, ARCHITECT, WHEELING, W. VA.

PIGEON-HOUSE FOR DR. H. E. OWEN, OCEANICA, N. J. MR. CHAS. I. BERG, ARCHITECT, NEW YORK, N. Y.

This is a frame building elevated about three feet from the ground, and resting on piers capped with tin, to guard against rats and weasels. The first floor and entire cage is for pigeons of fancy and high breeding, the tower being reserved for flight birds.

LEGAL NOTES AND CASES.

Mechanic's Lien. — For Lumber. — Defence of Payment to Carpenter.

In an action to foreclose a mechanic's lien for lumber supplied, *Gilcrist vs. Anderson*, the owner of the building set up as his defence that he had paid the carpenter, to whom the lumber was sold, in full. The plaintiffs proved that the owner knew that the lumber had been bought on credit, but did not know from whom the purchase had been made. Due notice of claim was served on the owner by the material-men. The suit was dismissed and the plaintiffs appealed to the Supreme Court of Iowa, who in September reversed the judgment. Judge Adams, in the opinion, said: *The owner claims that* the case falls within the decision in *Stewart vs. Wright*, 52 Iowa, 335, and such, we doubt not, was the view of the court. In that case the defendant, Mary L. Wright, averred for answer that before the service upon her of the statutory notice she had paid her contractor, Hood, and without "knowledge of any arrangement made by Hood for labor or materials for the building." On demurrer this answer was held sufficient. While the lien is a statutory one, and dates when perfected from the performing of the labor or furnishing of the materials, yet it is to be enforced in equity, and it was thought that it ought not to be enforced where it would be inequitable to do so. The case at bar differs from that in this: that Anderson knew that Troutman had to buy the lumber for the house. It differs also in the fact that it was provided in the contract that Anderson reserved the right to discharge mechanics' liens, if any should be claimed.

The case, we think, falls more nearly under *Winter vs. Hudson*, 53 Iowa, 336. It is true that in that case the owner knew that the materials for which claim was made had been furnished by the parties claiming the liens. In the case at bar, Anderson simply knew that lumber had been furnished by some one. In neither case was it known to the owner that the materials had been bought on credit. Hudson's liability was not based upon the fact that she had actual knowledge that liens could be claimed, but that her knowledge was such that she was put upon inquiry. The case at bar is not quite

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as strong a case for the sub-contractors, but we cannot distinguish it from *Winter vs. Hudson* unless we can say that the owner is put upon inquiry where he knows the names of the persons who have furnished materials, and is not put upon inquiry where he knows simply that materials have been furnished by some one. The test question is as to whether Anderson could probably, in the exercise of reasonable diligence, have discovered that the plaintiffs were entitled to a lien. We have to say that it appears to us that he could. Troutman, with whom Anderson was dealing, knew of whom he purchased lumber. Anderson's true source of information was abundantly apparent. If he had made proper inquiry of Troutman, and Troutman had refused to answer, or had made false answers, the case might be different. His means of information would not appear to be so good.

DAY, J. I concur in the foregoing opinion solely upon the ground that Anderson should have inquired of Troutman if there were any liens upon the property before making payment in full. If he had made such inquiry, and had failed to learn of the existence of liens, I think the liens could not have been enforced against him.

Real Estate Broker. — When entitled to his Commissions.

A, a broker, was employed by B to sell certain real estate for him, and he brought C to him, who was able and willing to pay the price asked, but he desired time to search the title before making payment. B refused to give this time, and A brought suit for his commissions, *Watson vs. Brooks*, in the United States Circuit Court for the District of Oregon. Judge Deady, in September, in giving judgment for the broker, said: — The broker must complete the sale; that is, he must find a purchaser in a situation, and ready and willing to complete the purchase on the terms agreed on, before he is entitled to his commissions. Then he will be entitled to them, though the vendor refuse to go on and perfect the sale.

Mechanic's Lien. — Material-man. — Agency of Contractor.

The Supreme Court of Nebraska, on October 24, 1882, in the case *Doolittle vs. Goodrich*, reversed a judgment in favor of a dealer in lumber who had filed a mechanic's lien for lumber supplied to build a house, on the ground that it appeared by the evidence that credit had been given for it to the builder personally. The Court, in the opinion, said: "Frances Goodrich is the owner of lot 5, in block 240, in the city of Lincoln. In November, 1880, she contracted with one James McLelland to erect a small house thereon, which he afterwards did. The lumber for this house was purchased from the plaintiffs by McLelland on his own account, and was charged to him on their books. McLelland was paid by Mrs. Goodrich the full contract-price for the erection of said building. Some time thereafter McLelland left the State, leaving the lumber-bill unpaid. An itemized account against Frances Goodrich and Elizabeth McLelland, the mother of Mrs. Goodrich, duly verified, was then filed in the county clerk's office in Lancaster county to obtain a mechanic's lien upon the premises above described. A judgment for the sum of $173 was rendered in the court below against Frances Goodrich, and directing sale of the real estate in question. The only question necessary to be considered in this case is, was McLelland the agent of the defendant, Goodrich, in purchasing the lumber with which the house was erected? In our opinion the testimony not only fails to establish the fact, but clearly shows that the lumber was sold to McLelland upon his individual account and that he was not her agent. This being so, she was not liable under the mechanic's lien law, in force at that time, for the payment of the claim. We adhere to our decision in the case of *McCormick vs. Lawton*, 3 Neb. 449, but it has no application to the facts of this case.

GREATEST RINGING BELLS.[1]

RUSSIA is famous for having the greatest bells in the world, but if the great *Tzar Kolokol* of Moscow, which has never served the purpose of a bell, be excluded, then Burmah takes the honor of having the largest ringing bells.

The Burmah bell-founders appear to have attained great perfection in that art, and they take great pride in their productions. The quality of tone of the Burmah bells is said to be very fine. The Mengoon bell is the greatest ringing bell in the world, weighing 201,600 pounds, and its probable diameter is 203 inches.

The great bell in Rangoon, called "*Maha Ganda*," weighs 95,000 pounds, with probable diameter of 155 inches, and is said to have a very fine tone.

The first great bell in Moscow was presented to St. Ivan's Church by the Tzar Boris Godunof, in the sixteenth century. This bell was actually hung and rung, but its weight, 288,000 pounds, was too great for its support; it fell and broke, and was recast in the year 1654. Diameter, 216 inches, and sound-bow 18 inches. During the fire in 1706 the bell fell and broke again.

The greatest bell in the world is that at Moscow, called *Tzar Kolokol*, or monarch bell. Its dimensions are 19 feet 3 inches high, diameter 22 feet 8 inches, thickness of sound-bow nearly 2 feet, and weight 443,772 pounds. The weight has evidently been calculated, because the Russians had no scale upon which it could be weighed. From the dimensions of the bell, taken by the writer, and the weight calculated, it should weigh nearly 500,000 pounds.

According to inscription on the bell, it was cast in the year 1733. In those days they had no means of transporting heavy weights and great bells were, therefore, cast in the church-yards close to where the bell was to be hung, as was the case with the great Moscow bell, which was cast in a pit close to St. Ivan's Church, in which tower it was intended to be hung.

The moulding of the bell was probably done in the ordinary way: namely, the core was built first, upon which the thickness of metal was laid with loam or clay, and the cope built over it. Judging from the unevenness of the inside surface of the bell, it is probable that the core was not swept but dubbed up, so that the bell is not of even thickness at equal distances from the lip. The outside surface is very even, and has evidently been swept by a steady sweep.

In preparing and melting the metal for casting the bell it appears that no exact composition was attempted, for the nobles and other capitalists of Moscow threw a great amount of silver and other metal into the furnace, which made it an uncertain alloy with much greater shrinkage than the minimum, which is, with 31 parts of tin to 100 of copper.

The moulding, casting and precautions for cooling and shrinkage of a bell of this size require more practical experience than probably these bell-founders were in possession of, for it is evident that the bell broke by shrinkage in the pit in which it was cast.

The cooling of a bell of this size requires a time of at least one month if not six weeks, from the day it is cast, but it appears that the bell-founders attempted to dig up the bell a few days or a week after it was cast; and it is also said that water was poured on the mould or casting; at all events, the bell was cooled too quickly, and cracked in several places around the lip, and in one place a piece weighing about 11 tons was broken off. The uneven thickness of metal also aided the breaking.

The great Moscow bell has, therefore, never been sounded, but laid in its casting-pit, partly uncovered, for a time of 103 years, in which time it was held in reverence by the natives, who were extremely jealous of its being touched or measured by strangers. Thus it laid as an object of wonder to travellers, and the people of Moscow visited it with pride at their festivals.

In the year 1836, the Emperor Nicholas decided to have the bell exhumed and raised, which was accomplished with great difficulty and expense. The engineers who first undertook to raise the bell were not given a fair chance to accomplish the work, because on their first trial the tackle were too light and gave way, for which the engineers, it is said, were sent to the mines of Siberia.

The Board of Admiralty then undertook to raise the bell, and succeeded in placing it in the position shown in the accompanying illustration, which is reduced from a large photograph procured by the writer in Moscow, in the year 1871. The bell is placed south of St. Ivan's Church, on an open plaza in the Kremlin, near to where it was cast.

It is said that the Empress Anne presented the bell to the church, but however that may be, it is known that the fragments of the bell which fell and broke in 1706 were used; and the citizens of Moscow contributed largely to the metal in the bell, which contains much silver and some gold. It is said that the value of the metal in the bell is $332,000, all uncirculating and dead money, for the bell has never struck a note.

"Think of that, ye money-mongers on the Rialto," says Rev. Alfred Gatty.

In some records of the great Moscow bell it is stated that the bell was actually hung and rung in the tower of St. Ivan's Church, and that it had been broken by falling to the ground. It is also stated that the building over the casting-pit took fire after the bell was cast, and the water used for putting out the fire fell on the bell in the pit and caused its breaking. But these records have been contradicted by competent judges.

The initial cut represents the "Bolshoy Tzar Kolokol."

The great Moscow bell rests on a granite pedestal with its broken-off piece on the ground. The enormous size of the bell can be perceived by the proportionate size of the men standing at the foot of it and by the size of the cathedral behind. The St. Ivan's Church in which tower the other large bells hang is close by, to the right of Tzar Kolokol, but not shown in the cut.

The female figure in bas-relief on the left side of the *latus* represents the Virgin, and the inscription is on the right side towards St. Ivan's Church. The uneven thickness of metal, at equal distances from the lip, can be seen and measured at the top of the broken-off piece on the ground. The form of the bell and its bas-relief ornaments are masterpieces of fine-art. Omitting the accidental unevenness of thickness, the proportions of the bell indicate that its constructor understood the acoustic properties of the vibrating metal when a bell is tolled.

Our modern celebrated bell-founders are far behind that constructor in proportioning bells for quality of sound. I should like very

[1] Extract from a paper by John W. Nystrom, in the *Journal of the Franklin Institute.*

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much to see the Tzar Kolokol recast the same size, and the form and ornaments exactly preserved. With our present knowledge and experience in founding, the recast bell would be a success.

The other great bells in Moscow and other places are noted in the accompanying table, in their order of sizes.

The Russians have generally a great number of bells of different sizes in their churches, but they are not toned for musical harmony or melody, and their ringing is not agreeable to strangers, who often make severe remarks upon their noise. During my five years in Russia I could never get accustomed to or appreciate the bell-ringing, which is a disagreeable jangling.

The great bell in St. Ivan's Church is rung three times a year, and produces a tremulous effect throughout the city, like distant thunder or the low notes of a powerful organ.

The old bells of Russia are much better in tone than modern bells cast in Moscow twenty-five years ago or thereabout, but I have information that they make better bells now.

The Russians never swing their bells, but hang them stationary, and even the smallest church-bells are rung by ropes attached to the clappers.

THE LARGEST RINGING BELLS IN THE WORLD.

Names and Location of Bells.	Date cast.	Actual Vibration.	Key-note.	Diameter. Inches.	Sound-bow. Inches	Sound-bow. Stroke	Weight. Pounds.
Moscow, Tzar Kolokol,	1733	74	D	272	23.	0.84	443,772
Burmah, Mengoon,	—	94	F♯	203?	16.?	0.80	201.600
Moscow, St. Ivans,	1819	105	G♯	185	14.75	0.80	127,350
Pekin, Great Bell,	—	—	—	156	—	—	120,000
Burmah, Maha Ganda,	—	125	B	155	12.5	0.80	95,000
Nishni Novgorod,	—	125	B	151	12.	0.80	69,664
Moscow, Church Redeemer,	1879	141	C♯	136.3?	10.6	0.80	60,736
Nankin, China,	—	—	—	112	—	—	45,000
London, St. Paul's,	1881	157	E♭2	114.25	8.75	0.76	42,000
Olmutz, Bohemia,	—	157	E♭2	121	9.125	0.75	40,320
Vienna, Austria,	1711	157	E♭2	118	9.5	0.80	40,200
Westminster, London,	1856	166	E	113.5	9.375	0.83	35,620
Erfurt, Saxony,	1487	176	F	103.6	9.75	0.75	30,800
Notre Dame, Paris,	1680	166	E	103	7.5	0.73	28,670
Montreal, Canada,	1847	176	F	103	7.8	0.76	28,560
York, England,	1845	187	F♯	100	8.	0.80	24,080
St. Peter, Rome,	1786	187	F♯	97.25	7.5	0.77	18,000
Great Tom, Oxford,	1680	210	G♯	84.	6.125	0.73	17,024
Cologne, Germany,	1477	198	G	95.	7.2	0.76	16,016
Brussels, Belgium,	—	210	G♯	95.81	7.75	0.71	15,848
State-House, Philadelphia,	1875	198	G	88.	6.375	0.73	13,000
Lincoln, England,	1834	210	G♯	82.85	6.	0.73	12,096
St. Paul's, London,	1716	222	A	81.	6.08	0.75	11,500
Exeter, England,	1675	210	G♯	76.	5.	0.66	10,080
Old Lincoln, England,	1610	249	B	75.5	5.94	0.78	9,856
Westminster, London,	1857	219	B	72.	5.75	0.79	8,960

CHINESE BELLS.

China is next in order of great bells, but their awkward form and projecting ornaments make them far inferior in tone to our bells.

The great bell in Pekin weighs 120,000 pounds, diameter 13 feet, and height 14 feet 6 inches. It is rung by one man striking its outside by a wooden mallet. An ordinary iron clapper would probably break the bell on account of its irregular distribution of metal.

The great bell of Nankin weighs 45,000 pounds. Large bells are very common in all cities of China, but all bad in tone, and chime-ringing is unknown there. The construction of Chinese bells shows absolute ignorance of the science of acoustics as applied to that art.

JAPANESE BELLS.

In Japan ringing bells are very common, and are a little better than those in China. They make the bells cylindrical, with a spherical top, and ring them by a weight hung on a rope striking the bell outside.

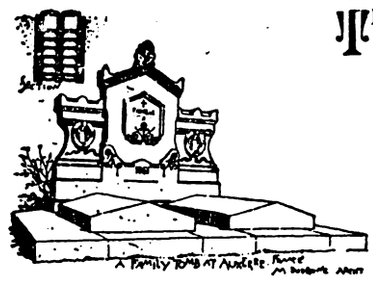
The Chinese and Japanese bells require double the amount of metal for the same volume of sound produced by our bells.

The ancient literature, that is, from the year 1495 to the end of the last century, was rich on bells, and the subject was treated by able scientific men. A civil judge, Maginus Tintunatius, in the Venetian service at Candia, when besieged by the Turks in the year 1571, was taken prisoner, and in his captivity amused himself by writing a treatise on bells, which is said to be the best written on that subject; but, as the Turks considered the bell as a symbol of sinful infidelity, the author was beheaded by the order of a pasha. The manuscript was, however, preserved and published, by which his name is immortal.

When the Turks took Constantinople, in 1453, they forbade the ringing of bells, for the purpose of preventing signals being given for popular revolt.

The art of bell-founding has not advanced in this century, but has gone backwards in many cases, which proves conclusively that a good bell cannot be produced by practical experience alone, but a scientific knowledge of acoustics is necessary with experience, not only for making a good bell, but also for producing the maximum volume of sound with the minimum quantity of metal.

THE VICTIMS OF POMPEII.



THE *Pall Mall Gazette* says:—The work of exploration which has been steadily going on in Pompeii for over a century, from the day when excavations first began on the site of what was then vaguely called "La Civita," in 1748, has led to other than purely archæological results. It has enabled a fairly accurate notion to be formed of the nature and extent of the catastrophe. We know, for instance, that the lava stream did not reach Pompeii, and that the city was not destroyed by fire. We know also that the eruption was accompanied by one or more shocks of earthquake, which threw down houses here and there, and buried men and women under their ruins. From the fact that skeletons have been found at the entrance to the public bath, which was quitted hastily by the few grand ladies who were not present at the gladiatorial performance in the amphitheatre, the time of the catastrophe can be fixed with approximate accuracy at or about noon. Above all, the discoveries of skeletons, every one of which has been carefully recorded for at least a century, enable some conclusion to be drawn as to the total number of victims of the catastrophe. It would be a mistake to suppose that the majority, or even a very large portion, of the inhabitants of Pompeii perished. The effects of the ashen shower were not instantaneous, and every one who could get away from the city on the first alarm probably saved his life. The bulk of the people were in the amphitheatre, which was situated near one of the city gates on the side remote from Vesuvius, and there was nothing to hinder every one in the great audience from getting away in time. Those who perished were those who deliberately put off their flight to save wife and child, or, still more often, valuables.

Of such victims 450 have been already found. From the year when the excavations began, in 1748, to the year 1826, the total number of human remains discovered was 160; from 1827 to 1845 it was 63; from 1846 to 1860 it was 60; from 1861 to 1872 it was 87; and from 1873 to 1881 about 100. But it is to be remembered that only two-fifths of the buried surface has been brought to light. On the whole, there appears good reason for putting the total number of human beings who perished in the eruption at least as high as 1,100. To these should be added the skeletons of three dogs, seven horses, eleven hens, two tortoises, fifteen pigs, ten oxen, and the bones of fifteen other animals. The remains of one of these dogs were found in the porch of the "House of Orpheus," and the cast which Signor Fiorelli has taken brings before us with a painful vividness one of the minor tragedies of that awful day. The poor beast was chained at his post, and in the general panic and confusion no one remembered to let him loose. The chain lay by the remains when they were found, and it was evident that the creature had strained his tether to the utmost in the effort to keep himself above the masses of ash and pumice-stone that rapidly accumulated around and over him. The cast is to be seen in the little museum at Pompeii. The dog lies half on his side half on his back, his slender head and open muzzle, gasping for a little air, buried between the hind legs, which have been convulsively brought forward in the last agony of death. But the process which has been so successful in reproducing the very form and likeness of this creature as he lived and died, has produced results no less extraordinary in the case of the human victims of the catastrophe. The idea of pouring plaster-of-Paris in a liquid state into the moulds left by the bodies in the soft ash did not occur to any one till it suddenly flashed across Fiorelli about twenty years ago.

Of the remains of the one hundred and eighty human beings discovered in Pompeii in the first hundred years of the excavations there is consequently only a written record. It is only from the *Journal of Excavations* for the year 1831 that we know of the touching and famous sight which greeted the eyes of the first discoverers of the "House of the Faun." On the floor of the banqueting-hall lay the body of a woman, probably the mistress of the house, with her jewels scattered where she had thrown them in despair of rescue or escape. The roof had been crushed in by the weight of falling ash and pumice-stone, and the hands of the dying woman were upstretched in a vain effort to keep off the impending weight. Parts of the body and clothing could still be made out, and a drawing could be made of one charming foot. But such records are lifeless and tame indeed beside the extraordinary portrait-statues which

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are now to be seen in the little museum at Pompeii. There are nine of these, or were a very short time since, and to see them is like seeing the men and women themselves of eighteen centuries ago. Fiorelli's method is as simple as possible. A small opening is made, the plaster is delicately poured in, and when it has had time to harden, the surface crust of ash is peeled off, and the man or woman comes back to life again. The details of clothing and feature have all left their mark on the soft ash, and are all faithfully preserved in the plaster cast. The results achieved by Fiorelli are striking and complete. Take the cast of the elderly slave, for instance, probably a man of some sixty years old, who appears to have been taking his siesta when the eruption began, and to have been painlessly asphyxiated in his sleep. He lies on his right side, the knees a little bent, the left leg drawn up, and the cheek resting on the right hand. The coarse, strongly-marked features and peaceful expression of the sleeper have all been perfectly preserved. A hardly less easy death must have been the lot of the four persons found lying on their backs in the street. Three of these were men, one of them a negro of the most pronounced type. The fourth was a woman of unusual stature, whose time for becoming a mother was evidently not far off. The three persons found lying on their faces do not appear to have found quite so quick a death. Two of them are women. One of these, an elderly woman, with a thin figure, lies by herself, her face buried in her arms, as if to protect herself from the fatal rain. The other lies side by side with a man in whose company she appears to have taken flight. She has covered her face with a fold of her dress, and the hands are tight clenched in the last death agony.

PAINTING THE CAPITOL DOME.

THE Washington *Post*, in a recent issue, says: The work of repainting the great white dome of the Capitol, which has been in progress several months under the immediate personal supervision of Signor Phillippo Costigini, the well-known Italian artist and frescoist, is offering daily attractions to hundreds of people, not a few of whom are visitors from every section of the country.

The men actually employed upon the outside of the dome are twelve in number. They are Washington painters, men of more than ordinary daring in their profession, who are not afraid to risk their lives for fancy prices, and that is what the Government pays for all its work.

It may seem incredible, but it is a fact, nevertheless, that to repaint the outside of the dome requires fifteen tons of pure white lead. This amount of material, under ordinary circumstances, would be sufficient to paint every house on Pennsylvania Avenue, from the Capitol to the Treasury building.

Common white paint would wash off the roof of the dome in the first rain that came along, and trickle down in big streams, leaving the dirt as palpable as before. The work of repainting would not be rendered so often necessary were it not for the fact that the dome is so constructed that the vertical joints or ribs of the walls, which are of iron, as is the entire structure, do not come in actual contact with each other, thereby allowing the rain to get in and rust. Were they joined, the grand old dome would assume each day, under the influence of the weather, new and horribly fantastic shapes, and some unusually cold morning would find it crushed like an egg-shell into a thousand fragments.

Fortunately no accidents have as yet occurred, although a single misstep or the giving way of a slender piece of rope would send the unlucky painter rolling down the steeply-curving roof and off into — well, eternity.

The most wonderful thing about the capitol dome, however, is yet to be told. It is said that there was a statue in ancient Egypt, called Memnon, which whispered sweet words of melody to the sun as he appeared above the horizon, and sang him to sleep with wild, weird lullabies. The grand, haughty Goddess of Liberty on top of the dome has a heart of bronze, but a good heart for all that, and one filled with true old Virginia courtesy. She has not yet picked up enough courage to attempt to do the prima-donna act, but every morning the good dame courtesies to the sun, and when he sinks in the west she again courtesies, but without turning around. Some time since architect Clark suspended a plummet-line from the interior of the dome, and it was found by actual measurement that the lead swung over a space of four and one-quarter inches, making a total dip out of the perpendicular of eight and one-half inches. This was caused by the alternate contraction and expansion of the iron.

A ludicrous mistake, which occurred not long since, may be mentioned in this connection. The coast-survey had in charge the surveying of the river-front, preparatory to locating the line for the reclamation of the Potomac flats.

The top of the dome was taken as one point of the surveyor's triangle in estimating certain distances. The calculations thus arrived at were found to sadly differ almost every day, and much swearing and perplexed thinking upon the part of the brilliant engineers was indulged in before the dipping of the dome was brought to mind. After that the top of the Washington monument did unceasing duty as a mathematic guiding star.

To remove the paint from the dome it is necessary to use potash. This is applied with a mop. In closing it may be remarked that it is in contemplation to remove the copper roof over the Congressional library, owing to its cracked, fissured condition.

The cost of repainting the outside of the dome is estimated at $6,000; this is for paint and labor.

THE $3000-HOUSE COMPETITION.

NEW YORK CITY, November 27, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Sirs, — The subject of the competition announced in the *American Architect* Nov. 18 inst., is, as you say, "of the widest possible interest." The problem of building a house for people who have good taste, but whose income is moderate, is something more than interesting: it is one of the most difficult that an architect can be called upon to solve. Many of us have found that when our client's demands were satisfied, and we had planned him a house that would thoroughly meet his wants, it could not be built for the money at command—or at least for the sum we assured him it would not exceed. Few of us, indeed, have ever been able to reconcile or adjust the wants of our clients to the price that they can afford to pay. The tendency of this state of things is to poor building; to flimsy construction and poor material, in order that the demands for space, modern conveniences, and appearance may be satisfied.

Your competition, judged as it will be by an expert jury, gives opportunity for determining what can be done — and well done — in the way of a low-priced house, and the number of competitors will undoubtedly be large. Several of us, who contemplate being of this number, are in doubt in regard to two points. These are the plumbing and heating. If allowable, we would put the direct question, are they to be included? We may anticipate your answer as something like this: The nature of the drainage and heating, and the amount of plumbing are matters left to the discretion of the competitors.

If you can consistently give any further particulars—the terms of the competition being of a very general nature — you would oblige us. If not, you may at least tell us whether we will be right in assuming that the jury of awards will take these points into consideration in making their award.

I am, etc.,

F. A. W.

[WE intentionally left the question of plumbing and heating an open one, and the jury will undoubtedly consider how far the inclusion or the exclusion of one or the other affects the rating of a given design. Probably no one would attempt to include more than a pump, a single water-closet, and possibly a bath-tub in the equipment of so modest a house, and of these we should be tempted to hold the pump only as an indispensable fixture. The water-closet may be properly displaced by the out-door privy or the earth-closet, while the bath-tub would be the luxury first done away with. As to heating, a small furnace — all that could possibly be needed — and a set range might be included in the cost of the more modest designs, but they are not usually considered by a client as forming part of the structure he expects to have provided for the sum he can afford to pay for his *house*. There is nothing unusual about the conditions of the programme: it is such a problem as may be brought to an architect any day. The only unusual thing — and for the credit of our architecture a very regrettable thing it is — is that when a man has so little money to expend, his first economy is usually dispensing with the aid of a properly qualified architect. This being so, we trust that we shall receive enough designs from architects in full standing to enable us to show the public that real economy lies in the opposite course. — EDS. AMERICAN ARCHITECT.]

WAX-FINISH.

BOSTON, November 6, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — There are several questions the writer would like to ask in regard to the painting specification printed in your valuable paper, viz: Why you specify a coat of oil for the oak instead of a filler? Will not the hard wax-finish spot, on being wet or moistened, in the same way as the waxed floors of Europe?

Is not Pellucidite good for floors, and does it darken the wood when used? Why do you specify shellac instead of Pellucidite for the maple? Will you also tell me how to finish oak to obtain the dark color of age?

If you can spare the time and space to answer the above questions you will greatly oblige

Yours truly, INEXPERIENCE.

[THE coat of oil under the wax-finish darkens the wood and brings out the figure, and also prevents it from showing grease-spots. The wax-finish spots slightly with water, but a little rubbing with a warm cloth or brush restores it. Pellucidite in our experience is too soft for floors, although it is used a good deal for finishing them. To bring out the beauty of maple the finest finish is the best, and shellac well treated is smoother than any Pellucidite finish we ever saw.

Oak is generally stained by applying strong ammonia with a brush. There is a limit, however, to the depth of color which can be obtained by

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this means, and some architects require a stain made with a sulphate-of-iron wash, followed by a decoction of gall or logwood, just as if the wood were to be ebonized, only using much weaker solutions. — T. M. Clark.]

POWDER-POST IN THE CHURCH AT ANDOVER.

Philosophical Society of Great Britain,
7 Adelphi Terrace, London, W. C.

To the Editors of the American Architect: —

Dear Sirs, — Last month you described the ravages of small black or blue worms in the wood-work of a small church at Andover, Mass.

I believe it will be found an effectual cure if the wood-work, or even the parts affected are painted with paraffine oil; I have not known it to fail. Yours,

F. Petrie, Capt.
Hon. Secretary.

THE ORDERS.

San Francisco, November 16, 1882.

To the Editors of the American Architect: —

Sirs,—Will you please inform me (through the *American Architect*), what works on the Orders (Classical Architecture) are the cheapest and best, and where they can be had. Yours respectfully,

A. R. M.

[The best book of the kind is Leveil's small edition of Vignola, published by Garnier Frères, Paris, and used in the Ecole des Beaux-Arts. It can be ordered through any bookseller. The chapters relating to the Orders in Gwilt's Cyclopædia form perhaps the best small treatise on the subject in English.—Eds. American Architect.]

THE PAUL REVERE STATUE.

1136 Girard St., Philadelphia, November 18, 1882.

To the Editors of the American Architect: —

Dear Sirs, — Please favor me with address of Chairman of Committee on Erection of statue to Paul Revere, mentioned in your last number. Respectfully, Frank Stephens.

[We do not recollect the name of the Chairman of the Committee. Perhaps some of our readers may know it. Mr. N. J. Bradlee, Pemberton Sq., Boston, is one of the committee. — Eds. American Architect.]

NOTES AND CLIPPINGS.

A Travelling Theatre. — A manager now proposes to make a tour with a portable theatre, including a stage, first-rate scenery, and an able company. The structure will be transported on and partly formed by eight railroad cars and can be set up in half a day. It will have a gallery, heating-apparatus, and a seating capacity of 1,500. By means of a temporary track a site can be reached half a mile away from the railroad.

Parsonages Taxable. — The Attorney-General of the State of New York has rendered an opinion that parsonages, even though they be on the same lot with churches, are liable to be taxed, if the parsonages are owned by the church trustees or corporations. It is held that the section of law referring to the exemption of clergymen does not apply to parsonages owned by the church trustees or corporations.

Removal of the Statue of the Iron Duke, London.—Decimus Burton's arch at the busy corner of Hyde Park, which supported for so many years the well-known statue of Wellington on horseback, has been taken down and will be re-erected at a lower site on Constitution Hill. The chariot group with attendant figures in the original design will be placed on it. The equestrian statue of Wellington is to stand on a new pedestal at some point not yet determined.

The Loss of Life by Fire. — Statistics of the loss of life by fire in fourteen of the principal cities of Europe between 1869 and 1879 place London at the head of the list. In every 100,000 persons in that period 8.3 lives were destroyed, while in Munich only 0.4 out of the same number perished. The *Pall Mall Gazette* can understand why fires in such towns as Cologne and Hanover, with their narrow thoroughfares and old wooden houses, should generally result in serious loss of life, "but London," it says, "possessing, as it does, an extensive fire-brigade and a fair supply of water, should at the least be as free from such accidents as the average city of the Continent. If these figures are corroborated by independent inquiry, they point to some serious defect in the construction of our houses or in our system for preventing fire."

The Efficacy of Lightning Protectors. — An interesting note on the efficacious protection of a house by a lightning protector during a recent storm at Colmar has been brought before the French Academy of Sciences by M. G. A. Hirn. The conductor was by no means a good one and terminated in a piece of iron lying in a water cistern or trough standing in the corner of a court. In spite of a terrific thunder-storm which struck the rod no part of the current left the rod, but all was discharged into the earth. The brass point was, however, fused. Experiments by M. Hirn fully confirm the views of M. Melsen that lightning rods should end in metal masses such as pipes, and not in so poor a conductor as water. When there is a flaming discharge seen at the point of a lightning-rod it is a proof that the rod is not a good one, for M. Hirn has proved that these rods act busily during a thunder-storm in giving off a silent discharge. By means of an electro-magnet in a derived circuit from the rod he has demonstrated this fact. When the storm passes the zenith the bars become magnetised. The same effect is shown by connecting a galvanometer in the circuit of the rod; and we may mention here that a plan was recently patented for charging secondary batteries in this way.—*Engineering.*

Architecture and Conquest. — The conquest of a country is not always sufficient to introduce the art or architecture of the conquerors. Of this we have ample evidence in India. The occupation of the region by the conquering race generally produces some modification of the arts practised in the locality which has been invaded. It was not so long ago that it was said, if the British had been turned out of India there would be nothing left as a monument of their rule but a few empty beer-bottles. We know that the Mohammedan conquerors of India at first employed the Hindus to build for them. There is sufficient evidence to show that Alexander did not introduce the Greek influence: it was brought to Bactria during the Greek rule of that country, and gradually worked its way thence to the valley of the Indus. If Alexander built cities after the defeat of Porus, on the banks of the Jhelum, or raised a monument to his horse Bucephalus, he must have been under the necessity of employing the workmen of the country, and they would build in their own style. The remains in the Punjab and the Peshawur Valley, which bear evidence of the Greek influence, all belong to a date centuries after the time of Alexander's invasion. As yet nothing has been found, nor is it likely that anything ever will be found in that region, with traces of Greek art upon it as old as 300 B. C. The probable date of the Manikyala Tope, as given by Mr. Fergusson, is between the sixth and eighth century A. D. This monument bears on it evidence of the Greek influence, and it was the traditional "Tomb of Bucephalus." Its character of being a Buddhist tope is now beyond dispute, and its date makes its connection with Alexander's time impossible. The Bactrian coins show that Greek artists must have been employed upon them. A glance at the plates of the "Ariana Antiqua" will make this evident. The earlier coins are the most purely Greek in their style; native artists must have copied these, and in the course of time the art, as seen on these coins, deteriorates, till at last its original character is all but lost. As these coins bear evidence that artists were brought from Greece to Bactria, it may be safely assumed that architects also came, who introduced their own architecture. At first the buildings they erected would in all probability be purely Greek in manner, but after the removal or death of the first introducers, when the style would be copied and re-copied by the natives, it would as surely lose whatever amount of purity it originally possessed, as the art on the coins did. In the Jellalabad Valley the remains show that this bastard style had come into existence and was regularly in use. It is a mixture of Persepolitan and Greek, combined with some features derived from India. — *The Edinburgh Review.*

The Timber-Lands of Puget Sound. — In a lovely country which once belonged to England, but which was ceded to the United States in 1846, there grows, according to the *Colonies and India*, the finest body of timber in the world. Fir and pine, and oak and cedar, of unsurpassed quality and practically unlimited in quantity clothe the mountains, overhang the rivers, and shadow the plains of the Puget Sound district, in Washington Territory. It is calculated that this region will yield 160,000,000,000 feet of valuable timber. The trees attain a remarkable development, both of height and beauty. The yellow-fir is frequently found growing to a height of 250 feet; the white-cedar to 100 feet, with a girth of over 60 feet; and the white-oak to 70 feet; whilst ordinary-sized specimens of the sugar-pine yield from 6,000 to 8,000 feet of lumber each. For long after its discovery this store of timber remained undisturbed; but in 1851 a saw-mill was built on Puget Sound, and thenceforward continually increasing inroads were made upon the forest until to-day no less than fifteen such mills are at work upon it. The largest of these has a cutting capacity of 200,000 feet per diem. During 1881 the export of lumber from Puget Sound amounted to 174,176,700 feet, valued at nearly $2,000,000, and since the establishment of the first saw-mill about 2,500,000,000 feet have been cut. Yet in spite of this we are told that the forests remain, for the most part, in virgin condition, except for a short distance from the banks of the streams and estuaries.

American Joinery Abroad. — Further information has reached us respecting the intended importation of American yellow-pine mouldings and joinery-work. There can be no doubt but that a vigorous effort will be made next season to create a market here for plain scantlings and other forms of American manufactured wood. Some novel forms of manufacture will be introduced, and, from what we can gather, every effort will be made to introduce them to the favorable notice of the trade here. The best recommendation which American joinery has is the really splendid quality of the material of which it is usually made. Few home-made articles at all approach it in this respect. When examining a pile of ready-made doors from the States we frequently turned over door after door without finding a blemish. For mouldings and architraves it may be quite possible to create an active demand, and with respect to pine doors, it may be said that this now exists. — *Timber Trades Journal.*

A Buried Obelisk at Rome. — Antiquarians at Rome are said to be exercised about an obelisk alleged by a writer of the seventeenth century to lie buried under the street between the Giustiniani and Patrizi Palaces. The municipality has decided to build a drain nineteen feet under the Via Giustiniani, and the accuracy of the old writer will soon be determined. During the excavations in the Roman Forum there were recently brought to light the remains of an ancient and forgotten church. The church has since been identified as that of Santa Maria in Foro. It is of small size, and was built within the western porticoes of the Basilica Julia and on the ancient level of the Forum. The discovery was made during the removal of the familiar modern causeway that crossed the area in front of the arch of Septimius Severus.

One Practice of Trades-Unions declared Illegal. — A Quebec judge has decided that the rule of trades-unions forbidding their members to work with non-unionists is illegal, and has given judgment in favor of a non-union man who sued the Ship Laborers' Benevolent Society for damages for enforcing his dismissal by a ship-master.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. No. 363.

DECEMBER 9, 1882.

Entered at the Post-Office at Boston as second-class matter.

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IN the death of Mr. J. Morgan Slade, which took place very suddenly last week, the architectural profession in New York loses a young member whose devotion to his duties and interest in all relating to them bade fair to raise him to high eminence. Mr. Slade received his professional training under Mr. Edward Kendall, the example of whose skill and care served admirably to prepare him for his subsequent work. On entering into business on his own account, he soon found himself busily occupied with commissions for the construction of mercantile buildings, which many circumstances combined, after his first successes, to throw in his way; and this branch of professional practice claimed nearly all his attention until the time of his death. The pursuit of any special class of work is usually attended with a certain disadvantage to a young man in retarding the growth of a reputation which is best acquired by dealing with a more varied *clientèle*, and it was only of late years that Mr. Slade found himself gaining a large general practice, which brought him more into contact with the rest of the professional world, whose fuller sympathy he enjoyed and appreciated as much as his associates did the experience and good judgment which he brought to the solution of problems of common interest. His loss will be a serious one to the New York Chapter of the Institute of which he was a member, and will be perhaps still more seriously felt among the business men, with whom he held extensive relations, and by whom he was regarded as an excellent adviser in matters relating to his profession.

THE Society of American Artists has published a circular containing the text of a resolution passed at a meeting held November 7 last, which calls the attention of the present Tariff Commission and of Congress to the fact that "whereas the United States is the only leading nation in the world which has not inherited the works of art of any great epoch of the past, it is at the same time the only nation that puts a penalty, by means of a tariff, upon the importation of works of art, both ancient and modern," and expresses the opinion that "all works of art should be excepted from the payment of duties, both in the interest of art in general, and of American art in particular." If this resolution expresses, as we suppose it does, the sentiment of the better class of artists on the subject, both they and the public are to be congratulated on the change of feeling which has slowly taken place. According to the *Evening Post*, it is only about fifteen years since a petition with many signatures was presented to Congress in favor of increasing, instead of diminishing the duties on foreign pictures, on the ground that the admission of works of art from other countries, even under the severe restrictions then imposed, interfered with the sale of the product of native genius. Such an appeal as this, although not very flattering to the capacity of American artists, perhaps expressed the self-distrust and consciousness of its own shortcomings which really characterized the best art of the country at that period; but a decade of success, abroad in competition with the best foreign masters, and at home in steady popularity and employment, has greatly raised the courage of the best American painters, and enabled them to understand the disadvantage to the community, and finally to themselves, of a virtual embargo on the pictures and sculptures which would, if introduced into this country, best serve to educate the public to an appreciation of the efforts in a similar direction of their own fellow-citizens. The ridiculous severity with which the statute has been administered probably hastens and gives point to the memorial of the artists, as it will still more to the expressions by which the general public will second it. As the law now stands, it is impossible for the American owner of a foreign picture to take it with him on a journey beyond the limits of the country, or to lend it for exhibition abroad, without paying the duty upon it over again, every time it is brought back to the place where it belongs. Under this interpretation, a gentleman of New York who happened to own a painting by a celebrated foreign artist was compelled to pay an enormous sum for the privilege of getting it back again after lending it to be hung with other works in a transatlantic gallery; and as Mr. Millet says in a letter to the *Evening Post*, the managers of an exhibition of the collected pictures of Alma-Tadema, soon to be held in London, are prevented from obtaining a considerable number of his best works, which happen to be owned in this country, by the fact that an unconscionable tribute will be levied upon them by the Government before they can be returned.

SOME foreign correspondents of the Woman's Institute of Technical Design in New York have conveyed to this country a proposition which the principal of the Institute, Mrs. Florence Cory, wishes to have at least thoughtfully considered. It seems that Christian Hammer, a wealthy resident of Stockholm, Sweden, has made a collection of bric-à-brac and objects of various kinds of interest which he is desirous of selling. He has received offers for portions of it from the South Kensington Museum, but prefers to keep the collection together, and would like to sell it to Americans, with the charitable hope, as it appears, that he may thus be instrumental in supplying, in part at least, the needs of a country so destitute of works of art as ours. With all necessary gratitude for the benevolent wishes of the venerable gentleman, we may venture to suggest that America is not quite so destitute as he imagines of the minor objects of fine art, and that a museum like that which we hope the Woman's Institute is forming can much better afford to pay a large price for a few pieces of furniture, jewelry or other objects of art-workmanship of high excellence than to spend three hundred and fifty thousand dollars, which is what Herr Hammer asks for his collection, to obtain in return a deluge of pictures, books, coins, porcelain, stone arrow-heads, scalping-knives, flint-lock guns, clocks, old boots, clothes, and manuscripts, of which one-half would probably be mere rubbish. It is said the collection comprises eighteen thousand portraits, of which we may safely say that not more than a dozen would be worth transporting across the Atlantic; while another large portion consists of books and manuscripts, some of which might possibly be of value to a library, but hardly to a school of technical art. The specimens of wrought-iron and glass work are probably well worth possessing, although not at an unreasonable price, and the same might perhaps be said of the porcelain; while many of the pre-historic relics might find place in one of the two ethnological museums in this country. The class of objects, however, which derive their interest from historical association would be worse than wasted here, and the credulous person or association of persons who may undertake to endow New York or Philadelphia with the clocks of Marie Antoinette, the jewels of the Empress Josephine, or the boots of Charles the Twelfth, will receive little thanks for their pains. What this country needs at present is, as Mrs. Cory justly feels, good examples of the lesser arts — beautiful works in glass, iron, brass, gold and silver, tapestry and embroidery, without regard to their history, associations, age, or other extrinsic qualities, which only serve to give a false or distorted idea of their value, and defeat the influence upon the mind and taste which they ought to produce. Such things are still to be bought at reasonable prices both here and abroad, and the judicious expenditure of a small part of the price asked for the Hammer collection would give the Institute a most excellent outfit.

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The meeting held in New York to promote the object of securing funds to build the pedestal for Bartholdi's statue of Liberty proved very successful, and it is pleasant to know that public interest in the occasion was sufficient to fill the Academy of Music completely. The speeches delivered were brief, happy, and to the point, and the gratifying announcement was made that a large part of the sum required had already been subscribed. It is much to be hoped that the remainder will soon be secured, if for nothing else, at least that the French contributors to the cost of the statue may have no further reason to complain of the coldness with which their gift is received. As to the statue itself, we do not at all share the fears of those who think that the eyes of the New Yorkers, trained to the appreciation of form by contemplation of the wonders of sculpture in the Central Park, will be unable to bear the sight of Bartholdi's masterpiece; and there are few pleasures of the future which we take more satisfaction in anticipating than that of occasionally seeing this modern Colossus, by far the largest statue ever made, predominating, from a height very little less than that of Trinity Church spire, over the giant city of the Western world. It is difficult to realize without some reflection how conspicuous the figure will be to the neighboring country. There is no natural eminence on Manhattan Island so high by nearly sixty feet, and the level beams of Liberty's torch will reach far over New Jersey and Long Island, and some distance, at least, into Connecticut. Its rays will be the first signal which will indicate to the traveller by sea, or from the Sound, his approach to the city, and they will follow him as he leaves it until all other trace of it has disappeared.

The last issue of the *Proceedings* of the Royal Institute of British Architects contains some very interesting details of the new examinations for admission to the Institute. Evidently, the examination is to be a serious matter, and it is gratifying to read the minute instructions to candidates for what is henceforth to be a real and valuable professional distinction. In what seems to be a little address to intending candidates, the paper says, very truly, that "it has come to be recognized that a young man, in order to prepare himself sufficiently for the profession of an architect, must do four things, namely: 1. Pass at least three years in a professional office. 2. Become a member of the Architectural Association, work in its classes, attend its lectures and compete for its prizes. 3. Pass the examination in Architecture. 4. Accept the professional obligations required from an Associate of the Royal Institute of British Architects, and submit himself for election to the corporate body." The examination itself is two-fold, candidates being obliged to submit "probationary work," in the shape of plans, elevations and sections of some simple building, with a perspective drawing, a sheet of details, and a sketch of ornament, from the round or bas-relief, which must be approved before they are admitted to the final trial. This examination proper is partly oral, and partly written, and occupies four days. A fee of three guineas must be paid by each candidate, but if he passes the examination and is elected an Associate of the Institute this is credited to him as his admission fee. The total number of marks allowed for the examination is six hundred, and candidates must obtain three hundred of these to be entitled to pass, while encouragement is given to those who make special effort by the offer of the Ashpitel prize, amounting to about ten pounds, to the candidate who gains the highest distinction. The first day of the examination is devoted to the history of architecture, which must be illustrated by sketches; the second is devoted to materials and construction, including the properties of stone, brick and timber, and the application of formulas for determining strength and stability; and on the third a plan, section and elevation of a given building must be drawn, and a specification for a single trade written, with the general conditions which usually accompany a set of specifications. The last day is occupied by an oral discussion of the probationary drawings.

The connection of the Architectural Association with all this examination work is particularly noticeable, and we know of nothing of the kind pleasanter and more admirable than the manner in which the provinces of the two great professional bodies in Great Britain have been defined, so that each does for the other the work which it cannot do for itself, both gaining immeasurably in dignity and usefulness by their mutual coöperation. The classes for instruction in professional matters which have always been maintained by the Association are now arranged with direct reference to the Institute examinations. For practice in work similar to that which is to be submitted by intending candidates, two classes of design have been established for the present season, with a third devoted to color decoration. In the elementary designing class an ingenious plan has been devised for inducing the members to carry on a parallel course of historical study, by giving the same problem for the whole year, but repeated under eight different forms. The project first makes its appearance as "an atrium to a Pompeian house;" four weeks afterward it assumes the form of a court attached to a Roman bathing establishment or palace; the next month it is a Byzantine cloister; then a Lombardo-Gothic cloister; then a late thirteenth-century cathedral cloister; next an English college quadrangle of the fifteenth century; then the court-yard of an English mansion of the Renaissance; and finally, the cortile of an Italian palace. Visitors, all members of the Institute, are appointed to receive and criticise the *rendus* in this class, and the classes generally are under the supervision, or perhaps we might say the advice, of some Fellow or Associate of the Institute. The advanced class in design undertakes problems of some difficulty, but excellently selected for practice; and the class for color decoration, besides making visits to existing examples of the art, prepares studies on subjects such as a "council chamber to a town-hall, in dark blue, Pompeian style;" "a boudoir in blue and white, Japanese," or a "dining-room, green and yellow." Besides these classes, courses of lectures on theory and practice are carried on throughout the season, and a combined system for giving and receiving instruction is applied to the study of construction, by distributing to members at the beginning of every month a set of printed questions, to as many as possible of which each is expected to find answers, and report them at the next meeting. As an incentive to the members of the classes to do their work well, no less than twenty prizes, varying in value from one to something like twenty guineas, are offered by the Association. We need hardly say that we look forward with hope, as well as desire, to the day when such an admirable system for raising the standard of professional attainment shall be imitated here. In three of our large cities there are already flourishing Architectural Associations of the younger members of the profession, as well as Chapters of the American Institute. So far, the relations between the older and younger bodies have been of the pleasantest character, but to make them as useful as they are capable of being, the one should come to be regarded as an introduction to the other. Rightly understood, their provinces are quite distinct, and the members of the junior associations would as little think of discussing the points of professional practice or etiquette which concern the Fellows of the Institute as these would of forming classes to instruct each other in drawing or writing specifications, but for all that, it is much to be desired in the interest of unity of practice and modes of thought, that the members of the Chapter should be familiar with the things taught and studied in the Association; and in default of any other entrance examination, the simple requirement that candidates for a Chapter should pass through the Association would tend very much to raise the standard, and promote the professional influence and enthusiasm of both.

A new and cheap process has been invented for the manufacture of hydrogen on a large scale. Peat, wood, lignite or other semi-vegetable substances capable of furnishing by destructive distillation a light carburetted hydrogen are heated in a retort, and the gas given off is transmitted through a layer of quick-lime, which withdraws the carbon from its union with the hydrogen, to leave the latter pure. Except for the fact that the uses of hydrogen are so few, this process would be of great importance, and it will at least be of service hereafter in promoting and facilitating experiments in aërial navigation, for which it has been generally necessary, on account of the great cost of hydrogen generated in the old-fashioned way, by decomposing acidulated water with zinc, to use ordinary illuminating gas, a substance more than ten times as heavy, and requiring the use of balloons of ten times the size, to obtain a given ascensive force, that would be required if they could be filled with pure hydrogen. It is possible also that the oxy-hydrogen blow-pipe, the most important materials for which can now be procured so cheaply on a large scale, may come into more extensive use.

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REPLY OF THE ARCHITECTS OF THE NEW CAPITOL AT ALBANY.[1]

STATE OF NEW YORK: ALBANY, October 6, 1882.

TO HIS EXCELLENCY ALONZO B. CORNELL,
Governor of the State of New York: Sir, —

WE have maturely considered the report of the Commission appointed by you "to examine the different parts of the New Capitol, as to the safety and durability of the work, more especially as concerns the Assembly Chamber and the ceiling thereof."

The Commission finds, as the result of its examination of the Capitol, that "its material and workmanship in general, are exceptionally good," and that "no defects worthy of special consideration other than those of the Assembly Chamber and the portions of the building immediately above and below it have been discovered."

As no defects above the Assembly Chamber are mentioned or exist, and as those below it are elsewhere in the report dismissed with the remark that "they are no evidences of danger to the building and may be repaired, as suggested by the architects," the observations of the Commission in respect to the Assembly Chamber, its abutments and foundations, alone require comment from us.

Some time before the appointment of the Commission we had the honor to address to you a letter upon this subject, in which we stated that "Our own careful and repeated researches, both while the Assembly Chamber was being designed and since it has been built, have convinced us that there is not the slightest reason for apprehension as to its safety. The reasoning which convinces us of this, convinces us also that any competent Commission, with a *full* knowledge of the facts in the case and with sufficient scientific knowledge to draw correct deductions from the facts, must come to the same conclusion."

We propose to show that the report of the Commission fully supports our opinion that "there is not the slightest reason for apprehension as to its safety;" that so far as these researches have been repeated by the Commission, the results are the same as our own, and that where the deductions of the Commission lead to a recommendation inconsistent with these results, it is because of a necessarily *imperfect* knowledge of certain facts in the case; facts that have been matter of close practical investigation by us for years, but which have been but incidentally considered in the large and varied examination required to be made by the Commission in a few weeks.

The question to be considered is the stability of the vaults of the Assembly Chamber.

This involves the principle of the arch.

The conditions of stability in an arch, aside from its foundations, are:

1st. That the area of its voussoirs is sufficiently large to resist the pressure upon them, the resistance of the material being known.

2d. That the line of pressures passes through the middle third of the voussoirs.

3d. That the abutments are competent.

1st. With reference to the strength of the material used in the construction of the ribs and arches of the Assembly-Chamber vaults, our tests upon a series of two-inch cubes had shown them to fracture under loads varying from 24,000 to 39,000 pounds per cube, which gives a minimum resistance of 6,000 pounds per square inch, and a safe load of 600 pounds per square inch, while the load imposed upon the stone in the ribs of the Assembly-Chamber vaults is but 270 pounds per square inch.[2]

The Commission also has made tests, as appears from its report, the result of which, no statement having been given in the report, we may presume left no question of the abundant ability of the ribs to resist the pressure imposed upon them. The report states that the stone "is not uniform in quality or strength." This is true of all building stone and must have been markedly so in the specimens taken for trial by the Commission, inasmuch as these were cut from the broken stone that had been removed from the southwest rib in 1880, which stone is known to have been strained beyond the limits of elasticity, and thus had ceased to furnish a criterion of the strength of this material.

2d. With reference to the lines of pressures the report of your Commission says: "We have critically examined the plans of the architects for the construction of the Assembly Chamber, and the work connected with it, and have given due consideration to their full and clear explanations of their computations and methods of construction. We have constructed lines of pressures for the main arches and vaulting ribs, and have made such other computations as were necessary for analyzing the strains of the different parts and comparing the results with the devices arranged to resist these strains. We have had the entire vaulting, with its supports and backing, measured, and their weights carefully computed, as a check to the accuracy of the quantities furnished to us by the architects, and we find that their calculations are substantially correct."

As these quantities were furnished to the Commission in their relation to the lines of pressures and in connection with them, this shows that the lines of pressures were also found to be substantially correct.

3d. With regard to the competency of the abutments, the report of the Commission implies, if it does not assert, that the abutments are now perfectly competent. It says: "If we could be sure that the unequal settlement of the foundations had permanently ceased, and they were capable of safely bearing an increased load, and that the present mixed construction of flying-arches and iron rods would *always* hold the arch-springers with absolute rigidity," etc.

But the Commission is not sure that the present mixed construction of flying-arches and iron rods would always hold the arch-springers with absolute rigidity, because, although it says that "the present construction is very ingenious, and its details have been studied with a minute care which reflects great credit upon its author," it also says that "the necessity which he has felt of introducing artificial heat in the attic to insure the safety of the Assembly Chamber, the largest room in this great monumental structure, should alone have been sufficient reason for abandoning the idea of securing the stability of a system of vaults by the devices adopted," and also because, as stated elsewhere in the report, "we have had the main granite shafts in the Assembly Chamber plumbed, and find that one of them *is slightly out of plumb*, leaning *in the direction of the plane containing the line of the resultant of the thrusts of the groined vaulting and the arches sustaining it;*" a result which would tend to show that these rods are not now fully doing the work they are intended to do.

If two corresponding columns standing on a line, north and south or east and west, did both lean outward in the direction of the resultant of the lines of lateral pressure of the vaults, this fact might be accepted as presumptive evidence that the arches had spread in spite of the restraint of the tie-rods which were intended to hold these springers firmly in place, and if the maintenance of a given temperature were necessary to the efficiency of the tie-rods the objections of the Commission would be well grounded. In fact, however, none of the columns lean in the direction of the lines of pressures, as will appear from the diagram and report below; and the heating of the attic is not at all essential to the efficacy of the tie-rods, as will be shown later under the head of Anchorage.

THE COLUMNS.

The following is a copy of a report of the survey made by Mr. Bingham for the Commission, upon plumbing the columns of the Assembly Chamber:

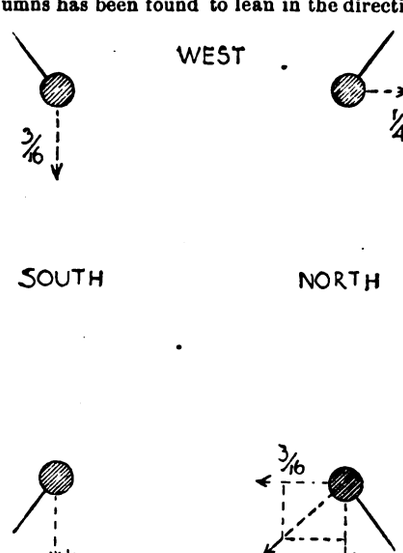
"The southeast column leans east ¼ inch. Plumb on north and south sides.

"The northeast column leans east ⅛ inch; south 3/16 inch.

"The southwest column leans east 3/16 inch. Plumb north and south.

"The northwest column leans north ¼ inch. Plumb east and west sides."

From the above table it appears clearly that no one of the columns has been found to lean in the direction of the resultant of the lines of pressures of the vaults; and that the inclination of two of them appears to be nearly opposite to that direction.



If any inference is to be drawn from the position of these columns; if their leaning of a quarter of an inch is of any constructional significance, it indicates that they are not in the least affected by the lateral pressure of the vaults and arches, and that so far as they are concerned the tie-rods are doing their work effectually. On the other hand, it may be asserted that a deviation of a quarter of an inch from the plumb line of a column twenty-two feet long and four feet in diameter is of no constructional significance. It may be due to an irregularity in setting; it may be a

[1] An Examination of the Grounds on which the Security of the Assembly Chamber is held to be in Question. By the Architects of the Capitol. Submitted to the Governor, November 17, 1882.

[2] The tests made by Major-General Q. A. Gillmore, U.S.A., in his official report of 1876, on two-inch cubes of the same stone are as follows: — 36,000 pounds, 37,650 pounds, 17,000 pounds, 24,000 pounds.

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deceptive appearance owing to the ellipticity of the column itself. That deviations from the vertical, in columns of the character of those in question, do not exceed those reported by Mr. Bingham would be generally regarded as evidence of great accuracy in building.

THE ANCHORAGE.

The nature and condition of the iron anchorage — viz.: the system of rods which connects the heads of the inverted flying-buttresses — when affected by changes of temperature, seems to need a more clear and technical explanation than has yet been given to this subject.

Wrought-iron expands under an increase of temperature of 180° Fahrenheit one part in 820 parts of length of iron. The range of temperature in the space (between the Assembly Chamber and the attic) wherein these iron rods are housed, a dark vault inclosed in masonry on all sides, would not be greater than 60° if the building were not heated in winter.

The temperature, under the circumstances, would not run down to the freezing point, nor would it rise in summer above 90°. The rods being 92 feet long, their expansion under the above rule of one part in 820 parts for 180° Fahr. amounts to 0.45 of an inch. The stone-work expands one part in 1,200 for 180° of heat, hence its expansion in 92 feet of length, under an increase of temperature of 60°, amounts to 0.3 of an inch. The expansion of the iron rods over that of the stone-work is thus 0.15 of an inch.

By reason of the greater conductivity of iron the expansion in the iron rods would ordinarily become effective before the stone has been heated sufficiently for a proportionate expansion, as stated above, but this is provided against by encasing the iron in brick-work, whereby it becomes impossible that the iron should attain a higher or lower temperature before the stone-work has attained the same.

This misapprehension that the heating of the building is necessary to the efficiency of the abutments is the only reason which the Commission gives for entertaining any doubt in regard to that efficiency. There is no reason to think that the Commission shares the belief which has been expressed by others that iron rods, as applied in the Assembly Chamber, are subject to a periodical expansion and contraction under changes of temperature, and that this expansion and contraction tends to deteriorate both the rods themselves and the stone-work constrained by them, inasmuch as the Commission has asserted no such objection to the system adopted. It may be well, however, to show why in practice no such alternation of expansion and contraction can occur.

Assuming the extreme case, that these rods came to a bearing under a temperature of 32° Fahr. (which was not the fact, — the arches and vaults were completed in May and the centres struck early in June), and that subsequently, say, during the heat of summer, or while the room was heated in winter, this temperature was raised to 92° Fahr.; then a rise of 60° in the temperature of the rods will, as we have seen above, elongate these rods 0.45 of an inch, and will also expand the stone-work 0.3 of an inch. Now what occurs? The rods being 0.15 of an inch longer than the stone-work, their hold upon the stone-work is relaxed to the extent of 0.075 ($\frac{3}{40}$) of an inch on each side of the centre, and the stone-work follows the expansion of the rods by reason of the lateral pressure of the arches acting upon it.

When the temperature of the rods and stone-work is subsequently lowered again to 32° Fahr. the stone-work contracts 0.3 of an inch. The contractive energy of the rods being 0.45 of an inch, the balance of energy of 0.15 of an inch is converted into strain upon the rods by reason of friction which does not permit the stone-work to return to its original position.

This strain can be computed as follows: 1104 : 0.15 : : 26000000 : *S.*, where 1104 is the length of the rod in inches; 0.15 its energy to contract in inches; 26000000 is the modulus of elasticity, and *S* is the resulting strain. From the above we have $S = \frac{26000000 \times 0.15}{1104}$ = 3532 lbs. pressure for one square inch area.

The only question remaining to be answered is, Are the rods strong enough to sustain this strain in addition to the load imposed upon them.

The iron used in the manufacture of these rods resists an ultimate strain of 72,000 pounds per square inch; its limit of elasticity is 36,000 pounds per square inch, and the safe load which may be imposed upon it is 18,000 pounds.

Now, the load actually sustained by these iron rods is 5,000 pounds per square inch. If to this we add the strain caused by change of temperature, which is 3,532 pounds, we have a total strain of 8,532 pounds per square inch, which is less than half the load per square inch that the rods are capable of safely sustaining.

If, on the other hand, the rods of the anchorage attained their utmost tension in the first instance, that is, if the abutment came to a bearing under a high temperature, which was actually the case of the Capitol vaults, then as soon as a lower temperature is reached, the contractive energy of the rods is converted into strain. In hot weather the load upon the rods is simply that of the lateral thrust of the arch which they restrain. In cold weather to this load is added the strain of contractive energy.[1]

The Commission reports no fact justifying a suspicion that the occurrences that gave occasion for this inquiry resulted in the least degree from any action or failure to act of the iron rods composing the anchorage of the Assembly-Chamber vaults. On the other hand, with reference to the suggested possibility of such failure in the future, because of a liability to greater changes of temperature than the rods have yet been subject to, the foregoing computation shows that any probable range of temperature, in the absence of artificial heating in winter, would not tax the capacity of the rods to one-half the amount of the load that may be safely imposed upon them.[2]

FOUNDATIONS.

1. *Continued settlement.* — The advice of the Commission that the vaulted ceiling should be demolished and a ceiling of wood substituted for it, rests substantially on its inability to obtain perfect assurance that the foundations on which its supporting piers finally rest have yet reached their final settlement. It says that the evidence that they have done so, "though strong, is not conclusive." And it adds that even were it conclusive, a contingency might be imagined in which the settlement would recommence. That is to say, if it should ever occur that by any means the subsoil of the site should be drained of its waters, the contraction that would result would involve a renewed settlement.

All sewers which will be required in the quarter of the city near the Capitol have already been constructed, and none of the results apprehended by the Commission have manifested themselves in the Capitol. That they have not done so is due to the fact that the bottom of all the sewers adjacent to the Capitol, are above its foundations. Even if they were not, the safeguard provided by the puddled wall surrounding those foundations, would effectually prevent injury from that source; but if, notwithstanding, the site should be drained of its moisture, no part of the structure, nor of any structure in Albany, resting on the same bed of clay, would be safe, and a study of the possible special effect of an occurrence so remote and improbable on the vaults of the Assembly Chamber can hardly be asked of us.

Turning then to the question of the present, it is to be stated that levels have been taken from time to time during the last two years with a view to determine whether the settlement had been completed, and that the surveyors have invariably reported their inability to find any appreciable evidence of change. We cannot say that this leaves no room for doubt, but we submit that no such destructive and costly proceeding as that proposed by the Commission can be properly based on such doubt, particularly so when it would be perfectly feasible within a month or two, by the use of processes and instruments of special construction and refinement, to obtain observations, to say the least, of much more nearly conclusive character.

On the other hand, if strong evidence did not exist that the settlement has ceased; if a doubt could be reasonably sustained; even if strong evidence could be produced that the settlement is still continuing, it should not be forgotten that the practice of mechanics presents various methods by which a further settlement can be arrested. Under date of September 10, 1882, we presented to the New Capitol Commission a report, accompanied by a drawing, which shows how the area of the footings under the piers which support the Assembly-Chamber columns might be doubled with an inconsiderable outlay of labor and material. The adoption of this expedient would effectually remove all doubt on the subject.

2. *Inequality of settlement.*—The report of the Commission contains the following sentences:

"To this end we caused a new set of levels to be taken, from which it appears that, although no very unusual amount of settlement has occurred, the settlement has not been uniform. The footing-courses directly under the large granite columns which carry the vaulted roof of the Assembly Chamber were uncovered for our inspection, and we find that the piers resting on them have settled more than the adjacent walls, and that there is *a difference in settlement between the piers themselves.*"

The above explains that the total settlement is not larger than might be expected in such a heavy building upon any foundation other than rock, but that all walls and piers have not settled alike.

We have carefully investigated this, and find the fact to be that all the outside walls, the walls running up to the roofs everywhere, and the piers under the columns of the Assembly Chamber — in other words, all the supports forming the main structure of the building — have settled alike, but that all these have settled more than the piers and walls which support only the floors of the building.

[1] This strain of contractive energy is popularly believed to be of unlimited magnitude. It is believed that an iron rod contracted by cold will so contract in spite of an opposing force, no matter how large; but this is not true. Contractive energy is a form of mechanical work, and as such can be measured accurately, as has been shown above. The limit of elasticity of the material being known to be 36,000 pounds, the question may be answered, "what is the temperature which will initiate a deterioration of the cohesive strength of the rods?" The load being 5000 pounds per square inch the rods will not be strained by a reduction of temperature beyond the limit of elasticity until the strain amounts to 31000 pounds. The strain caused by a reduction of temperature of 60° being 3532 pounds, we have 3532 : 60 :: 31000 : X wherein X = the number of degrees Fahr., which will extend the rods to the limit of elasticity, and $X = \frac{31000 \times 10}{3532} = 526.6°$, which means a variation of temperature from 90° down to 436.6° below zero.

[2] The attic understood by the Commission to be artificially heated with a view to avoid a contraction of the tie-rods is designed to be used as a document room. When so used it will need means of artificial heating. The misunderstanding of the Commission as to the motive of the heating-apparatus would have been impossible had its examination of the premises been made early last winter, when not only was the apparatus not in use, but the windows were left open night and day.

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The difference of settlement between the two sorts of walls and piers is something less than one inch.

As the piers under the Assembly-Chamber columns have not settled any more than the outside walls, which are now no heavier than the walls had in view by Mr. McAlpine when he designed the foundations of the Capitol, this is presumptive evidence that the footings under the walls supporting the Assembly-Chamber columns are not loaded more per foot than the footings under other walls which are not considered by your Commission as being loaded to the verge of safety. The Assembly-Chamber columns supporting a symmetrical structure are all loaded alike, and unless there is a material difference in the compressibility of the soil upon which these columns are founded (a difference much greater than that described by Mr. McAlpine in his published report), the inequality of settlement between the piers of the Assembly Chamber, if such an inequality exists, must be very small. An examination of Mr. Bingham's report of levels taken for the Commission, of which the following is a copy, will throw light upon the point.

Mr. Bingham, taking levels at the top of the bases of the Assembly-Chamber columns, and comparing these levels with the top of the base of the northwest column, finds —

"The top of the base of the northwest column is 0.000 *datum*.
"The top of the base of the northeast column is + 0.015 feet.
"The top of the base of the southeast column is + 0.030 feet.
"The top of the base of the southwest column is + 0.080 feet."

This means that the top of the base of the southwest column in the Assembly Chamber is now $\frac{3}{4}$ of an inch higher than the top of the base of the northwest column.

Can we conclude from this that the northwest column has settled more than the southwest column by nearly an inch? Surely not. Inasmuch as the total settlement amounts to two inches only, this would imply a compressibility of the soil under the northwest column 100 per cent greater than under the southwest column. This, of course, cannot be. But Mr. Bingham has also taken levels on the top of the concrete in the sub-basement, where he found, taking the top of the concrete under the north-west column as .0000 *datum*,

"The top of the concrete under the northeast column — 0.090 feet.
"The top of the concrete under the southeast column — 0.200 feet.
"The top of the concrete under the southwest column — 0.270 feet,"

which means that the top of the concrete under the south-west column is now $3\frac{1}{4}$ inches below the top of the concrete under the northwest column; or, in other words, that if the concrete was built level originally, the southwest column has settled $3\frac{1}{4}$ inches more than the northwest column.

Taking these two tables together, it would appear that the column which settled the most on the top settled the least at the bottom. This is an impossibility, and must lead to the conclusion that these measurements indicate not settlements, but irregularities in building.

All that can be said to sustain an opinion that inequalities of *settlement* can be detected in Mr. Bingham's report of 1882 is this: that while the greater part of this seeming difference in the levels of the Assembly-Chamber bases is doubtless owing to a difference in the original setting of the stone-work, a part of it *may* still constitute an actual difference in settlement, and it is an interesting engineering question whether this is so or not. An approximate solution of the problem becomes possible if we can compare the *status* of levels of the bases of the Assembly-Chamber columns with the *status* of similar levels taken at some other time, and the principle involved which leads to a sound conclusion is as follows:

If two piers, A and B, of equal weight and equal or unequal area of footing, compress the soil upon which they are built unequally, for the reason that this soil is not of equal density, or for the reason that the footings are unequal, or for both reasons combined, an unequal settlement must ensue. For example, to take an extreme case, the pier A may go down into the ground two inches, while the pier B settles but one inch. Now, if this settlement should continue a year or two, the preponderence of the probability is that the increments of the additional settlement will be proportionate to the respective original settlements, and while the pier A settles, let us say one-fourth of an inch during the ensuing two years, the pier B will settle during the same time one-eighth of an inch, and at the end of two years the differences of levels between the two piers will be one inch and one-eighth, while after the first settlement the difference was but one inch.

This leads to the establishment of the following general law: *Differences of unequal settlements*, as above described, *if continued for any length of time, increase in quantity;* and if in a structure we find an inequality of levels we cannot consider this inequality to be the result of an unequal settlement unless the inequality is known to increase in time. If it does not increase in time we must conclude that this inequality of levels is nothing more than an accidental irregularity in building, common to all structures of masonry.

Now, levels of these same bases, taken by Mr. Bingham in December, 1880, nearly two years ago, were as follows:

The base of the northwest column being 0.000 *datum*.
The base of the northeast column was + 0.009.
The base of the southeast column was + 0.034.
The base of the southwest column was + 0.088.

The inequality of levels observed in 1880 has not *increased* in 1882; according to the tables it has decreased. What conclusions can we draw from a comparison of these tables? Simply that they do not indicate either a progressive or an unequal settlement. But they do indicate errors of building or of measurement, or both; which, when their minuteness is considered (the largest being less than 0.1 of an inch) are not a reproach either to the builder or the surveyor.

The "material and workmanship" of the Capitol, the Commission says, "are exceptionally good," yet there can be no doubt that if levels were taken throughout the building, or in any other building, whatever its excellence of workmanship, variations proportionate in magnitude to those found in the Assembly Chamber, would everywhere be discovered. The tenor of the report shows that the Commission is, itself, more or less impressed with the insignificance of these variations. In a work which is not a machine, an astronomical instrument, but a piece of masonry, differences of fractions of an inch are not of practical account, and cannot be made the basis of conclusions detrimental to the stability of the structure.

CONCLUSION.

It appears from the foregoing that the apprehensions expressed by your Commission (1) of a possible future failure of the foundations by reason of a drainage of the soil on which they rest, and (2) of a possible failure of the tie-rods by reason of extreme variations of temperature, would not have been entertained if the facts in the case had been fully and completely brought to the knowledge of the Commission. In a technical review of the report of the Commission, we do not feel called upon to advert to apprehensions expressed by persons who may have discussed the subject without either the knowledge or the responsibility upon which the Commission has acted. The report of the Commission sufficiently shows that there is nothing alarming or unusual, as seems to have been supposed by persons less familiar with the history of monumental architecture, in the expedient of adding to or otherwise rearranging the load of a vault in order to perfect its equilibrium, and that this process does not necessarily indicate defective construction; that during the process of settlement, and under conditions of imperfect equilibrium, a stone or a number of stones may be fractured without compromising the stability of the vault. When these things occur, the question presented to the constructor is, whether the cause of these derangements is organic or incidental? If organic, can it be remedied; if incidental, has it passed away?

The fractures of the ribs in the main vault of the Assembly Chamber are traceable to the disturbance of equilibrium during the main settlement of the building. This settlement, though small in quantity, was, and could not but be rapid in its progress. The north centre of the Capitol, which contains the Assembly Chamber, was run up from the floor-line of the chamber in something less than eighteen months. From this floor-line to the ridge of the roof, the building thus constructed, considered by itself, constitutes a structure 140 feet high, 142 feet long, and 92 feet wide. Considering, moreover, that the chamber was vaulted, eighteen months was a very short time to allow for the erection of such a building and for the completion of its settlement. That such evidences of disturbance as are presented by the fractures of the ceiling should have followed is not matter either for astonishment or for apprehension, nor is it so considered by the Commission.

That the causes of these fractures are neither organic nor permanent, is manifest from the report of the Commission, and has, we think, been fully demonstrated in the course of this communication. Practical proof of this is furnished by the facts that the stone substituted in 1880 for a fractured stone then removed from the southwest rib has since stood, and now stands, in perfect condition; and that there has since been no notable change in the fracture noted at the same time in the northwest rib.

It is believed that the assurance which the Commission was unable to find of the continued efficiency of the system of abutment employed in the Assembly Chamber has been supplied by the explanations we have given of that system. No reason, therefore, can be found in the report of the Commission, taken in connection with the facts herein presented, why the vaulted ceiling of the Assembly Chamber should be demolished, unless it be the apprehension of the Commission that, in case of a future drainage of the sub-soil, the vaulting of the Assembly Chamber may be earlier or more seriously affected by the resulting settlement than other portions of the Capitol, by reason of the greater weight imposed upon its foundations.

We have already given our reasons for not sharing the opinion of the Commission that these footings are more heavily loaded in proportion to their area than footings under other main walls of the building, or the apprehension of the Commission that such a drainage will occur, or that its effects, if it should occur, would be more disastrous to the vaulting of the Assembly Chamber than to any other part of the Capitol, or to the Capitol than to any other building in Albany which stands on the same bed of clay; but, inasmuch as the footings under the piers of the Assembly Chamber may be readily increased so as to diminish their loads to less in proportion to their area, than those imposed by walls in regard to which no apprehension is felt, the adoption of the plan for that purpose heretofore submitted will serve as a measure of abundant precaution against even these improbable contingencies.

We find in the report of the Commission no warrant for any further recommendation, except that the fractured stone still remaining

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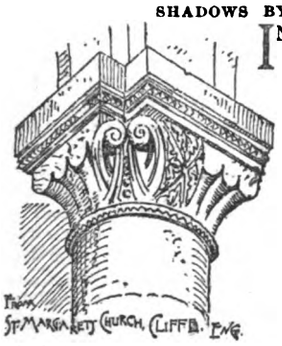
in the main vault be replaced; that the work be properly pointed, and that the equilibrium of all the vaults be reviewed, and if need be, corrected. Nor can we find in the report warrant for any other opinion than that when these slight repairs are made, the vaulted ceiling of the Assembly Chamber will be a perfectly sound and permanent structure. In its present condition and without repairs, there is nothing in the condition of the ceiling to warrant apprehension in regard to its safety, or to prevent the immediate occupation of the Chamber by the Assembly.[1]

Submitting all this to your kind consideration, we have the honor to be, Most respectfully,

Leopold Eidlitz,
H. H. Richardson,
Frederick L. Olmsted,
Architects of the Capitol.

PAPERS ON PERSPECTIVE. — XVI.

SHADOWS BY ARTIFICIAL LIGHT.



IN determining the form of shadows cast by artificial light we might follow the same line of argument as when we discussed the shadows cast by the sun. Here, as there, the (invisible) shadow of a point is a line drawn through the point from the source of light, and its (visible) shadow on any surface is the point where this line pierces the surface. Here, as there, the (invisible) shadow of a line is a plane in space, and its (visible) shadow upon any plane that receives it is the line of intersection of these two planes, its vanishing point being at the intersection of their traces. Here, as there, the trace of the plane of shadow might be found by drawing a line through the vanishing points of two of its elements, one being the vanishing point of the line that casts the shadow, and the other the vanishing point of the (invisible) shadow of some point in that line.

306. But the two cases differ in this, that in the case of sunlight the vanishing point of this last line is always known beforehand. The shadows of all the points are parallel lines, and have a common vanishing point, either in the sun, or in the shadow of the spectator's head, opposite the sun. With artificial light, however, the lines drawn from the source of light to the different points of the line whose shadow is to be found are not parallel but divergent. Each has a direction of its own and a vanishing point of its own, and if a method were followed analogous to that employed for parallel rays of light the vanishing point of each ray would have to be separately determined.

307. In casting shadows by artificial light, however, it is not so important to obtain the vanishing point of the line of visible shadow as it is in sunlight. For, in the sunlight, the vanishing point of the shadow of a line, when once obtained, serves for the shadows of all the other lines of the system, since the shadows are parallel as well as the lines themselves, and all have the same vanishing point. But in artificial light the shadows of parallel lines are not parallel, and the vanishing point of one is of no service in drawing the next one.

308. It is accordingly just as well, and it is much easier, to find the shadow cast upon a plane by a line exposed to artificial light by finding the shadows of its extreme points and drawing a straight line between them. Figure 81, *a*, shows how this may be done. The point in which the ray S' touches the ground is one point of the line of shadow, the ray S'' gives a second point, and the point where the line itself pierces the ground gives a third. Either two of these suffice to fix the line of shadow in position and direction. The shadow of any point in the given line can then easily be determined.

309. This is, whether in sunlight or artificial light, the most convenient way of determining the shadow of a curved or irregular line. It amounts, virtually, as the figure shows, to letting fall a perpendicular from each point upon the plane in question, and drawing its shadow, and then passing a line of shadow through the points thus obtained, as is shown in Figure 81, *b*.

310. But a plane given by a line and a point can be determined by a line drawn through the point parallel to the given line, as well as by one crossing it. The same result as in Figure 81, *a*, may accordingly be obtained by employing the method shown in Figure 81, *c*.

311. The point V^M having been determined, a ray, S^M, parallel to M, is drawn through the apex A, touching the ground at its point of intersection with the horizontal line beneath it, the line M being also prolonged to a similar point. This ray, the line M, and the horizontal line, L, joining their extreme lower points, are obviously all in the plane of shadow.

312. The line prolonged in the other direction, beyond M, being the line in which the shadow of M intersects the horizontal plane, is obviously the visible shadow of M on that plane, the exact length of which can be cut off by drawing divergent rays from A through the extremities of M, as in Figure 81, *a*.

313. The shadow of any line cast on any plane surface by an artificial source of light may accordingly be found by drawing a single ray parallel to the line in question, and finding the points in which both the line in question and the ray will pierce the plane on which the shadow falls. A line joining these points will be the line in which the plane of rays passing through the line intersects this plane, and, if produced beyond the point where the line pierces the plane, will give the line of its shadow.

314. This method seems less direct than that of Figure 81, *a*, which is, indeed, often preferable for single lines. But the method just explained is to be preferred where several parallel lines are subjected to artificial light. For the point *x*, Figure 81, *c*, where the parallel ray pierces the plane upon which the shadow falls, holds the same relation to one line of the system as to another, the shadows of all of them passing through it. The shadow of the line M_2, parallel to M, in the figure, is directed towards this point. It is then an apex of converging lines, and is as important and serviceable a point when the shadows of parallel lines are cast by artificial light as their vanishing point is when they are cast by sunlight, and answers the same purpose in saving labor.

It appears then that, in artificial light, the shadows upon a given plane of a given system of parallel lines all converge to the point in the place at which it is pierced by an element of the system passed through the source of light.

315. Figure 82, Plate XVIII., illustrates the ease with which can be found the shadows of vertical lines upon a horizontal plane. The shadow of every such line is obviously a vertical plane, of which the vertical line dropped from the source of light, A, is also an element. The line joining the lower ends of these vertical lines is accordingly the intersection of the plane of shadow with the ground, and its prolongation gives the line of shadow. This has, indeed, been done incidentally, as was said, in Figures 81, *a* and *b*.

The figure shows, also, that a similar procedure may be followed in the case of a horizontal line, normal to a vertical plane, the projection of the apex of rays upon that plane being known. (314).

316. The principle of Figure 81, *c*, is illustrated in Figure 83, where the shadows of several parallel lines are thrown upon a broken surface composed of several planes. The shadow of each line is directed, in each plane, towards, or away from, the point where a ray drawn parallel to it through the apex of rays, or source of light, pierces that plane. As the same ray is parallel, of course, to all the lines of the system, one ray suffices for them all, and their shadows, in each plane, are directed towards the same point.

The vertical and inclined lines that cast the shadow lie in a vertical plane, and the vertical and inclined rays taken parallel to them lie in a vertical plane parallel to it. The points 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, in which these rays pierce the planes on which the shadows fall, lie in the line in which the plane of rays cuts those planes.

Of these points, 1, 2, and 3 are those in which the vertical ray pierces the ground and the two inclined planes at the bottom of the wall, and the shadows of the vertical bars cast upon these planes are directed to these points; 4, 5, and 6 are the points at which the horizontal ray pierces the three vertical planes of the wall and base, and the shadows of the horizontal bars cast upon these planes are directed towards these points; 7, 8, and 9 are the points at which the inclined ray pierces these three vertical planes, and 10 and 11 those at which it pierces the two inclined planes, and the shadows of the inclined bars falling upon these five surfaces are directed necessarily towards these five points or apexes.

The shadow upon the vertical wall of the irregular line of the arch and the moulding that supports it, is found by the method shown in Figure 81, *b*, (309). Horizontal lines are drawn from successive points perpendicular to the surface of the wall, and a line of shadow is drawn through the shadow of the successive points.

317. It is to be noticed that if one were to stand under the arch, with his eye at the point occupied by the lamp, he would see just so much of the wall as is now in light. These processes enable us then to determine how much of what is shown in a picture is visible to the personages represented in it. In Figure 83, for example, if we suppose the eyes of the young man standing outside the arch to be an apex of visual rays, and then find the shadow, so to speak, cast by them upon the wall, the point 12 being the projection of this apex upon the plane of the wall, we find that the light of his eyes just reaches the young woman sitting at the window within.

Pneumatic Transmission of Force. — A new system of transmitting force to a distance is about to be tried in Paris. It consists in maintaining in a pipe system by means of engines at a central station a certain degree of vacuum (57 centimetres of mercury). A branch pipe enters the house of each subscriber, and is connected with a rarefied air motor devised by M. Tatin. The sewers in the Boulevard Voltaire and the Avenue Parmentier are utilized for the pipes, a distance of 600 metres. The canalization is calculated for a development of one kilometre distance from the central station, and the losses by friction in the pipes do not exceed three per cent. The pipes are mainly iron, but those entering the houses are lead. The Tatin motor possesses the necessary qualities of great simplicity and easy replacement of pieces. It has a vertical oscillating cylinder. Each motor is arranged to work at an average speed; the work for all is thus sensibly constant, whence results a very easy method of charging subscribers for their consumption of power.—*St. James's Gazette.*

The Dangerous Opera-Glass. — The Lord Chamberlain, in view of the fact that a heavy opera-glass falling from a height on a human skull may seriously damage the latter, has ordered a small ornamental gilt-wire netting to be placed upon the arm-rests of the boxes of London theatres.

[1] Two remarks of the Commission touching supposed defects of the vaulting have not been noticed in the above review, since both are plainly founded upon imperfect observation. The wall referred to as being out of plane is not in fact a wall, but a row of thin ashlar, screening a hollow space. The "portion of vaulting surface resting upon" the north-west rib is not "cracked." The joints are open, and only need filling with cement.

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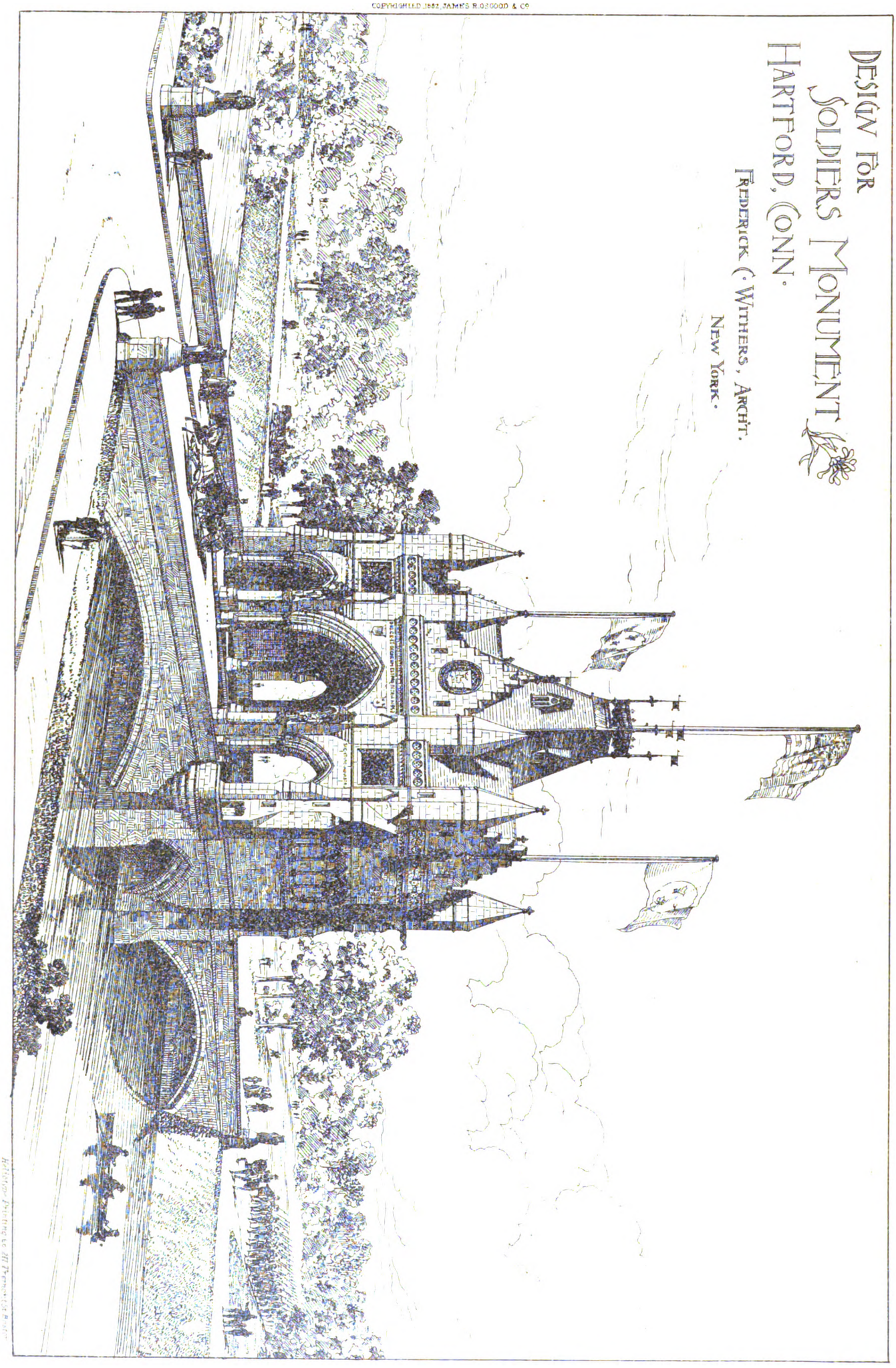

Design for Soldiers' Monument, Hartford, Conn.

Frederick C. Withers, Archt.

New York.

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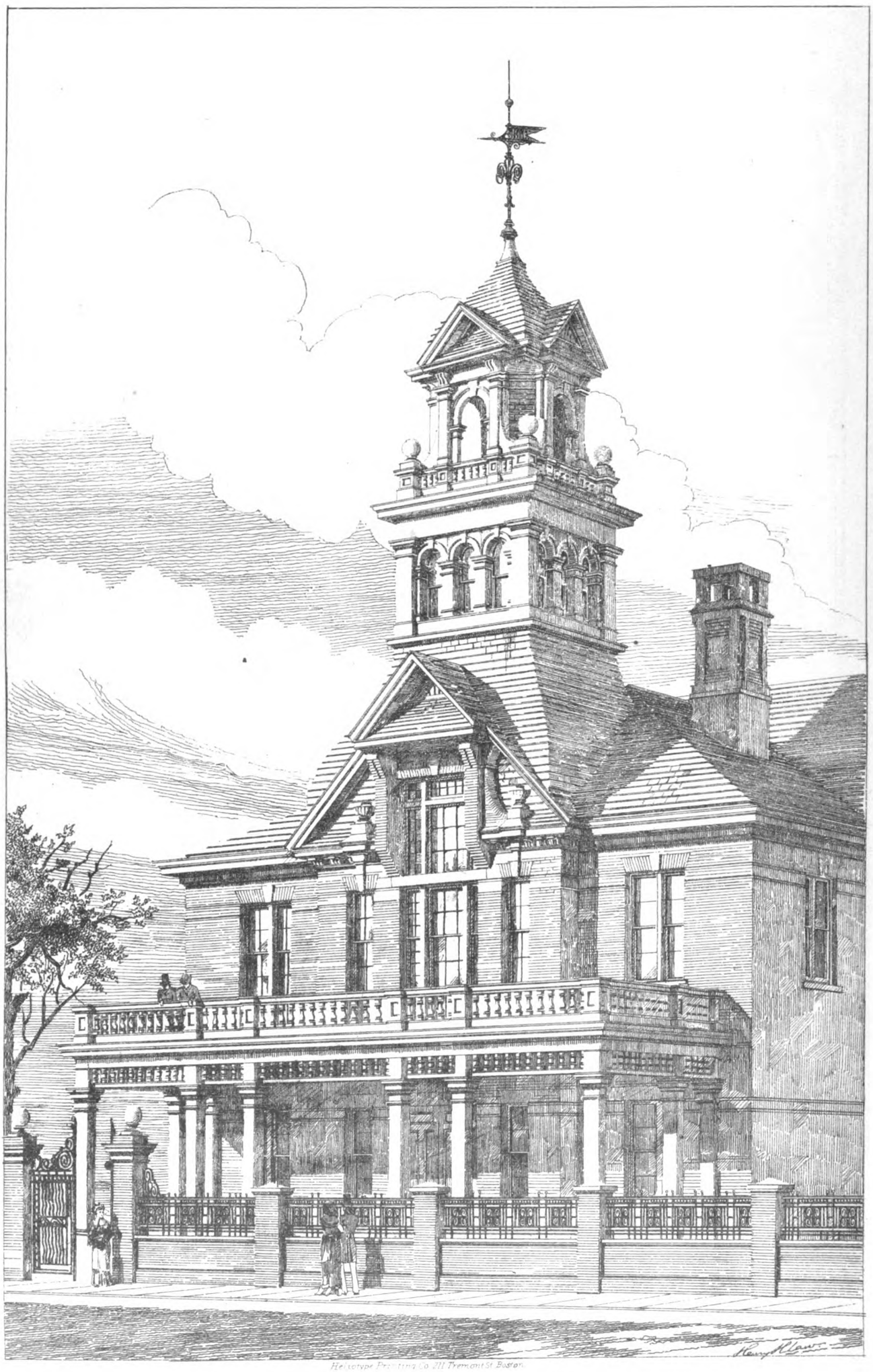

Heliotype Printing Co. 211 Tremont St. Boston.

COURT-HOUSE PRINCE GEORGE'S COUNTY Md. FRANK E. DAVIS, ARCHt.

DRAWN BY HENRY H. LAW.

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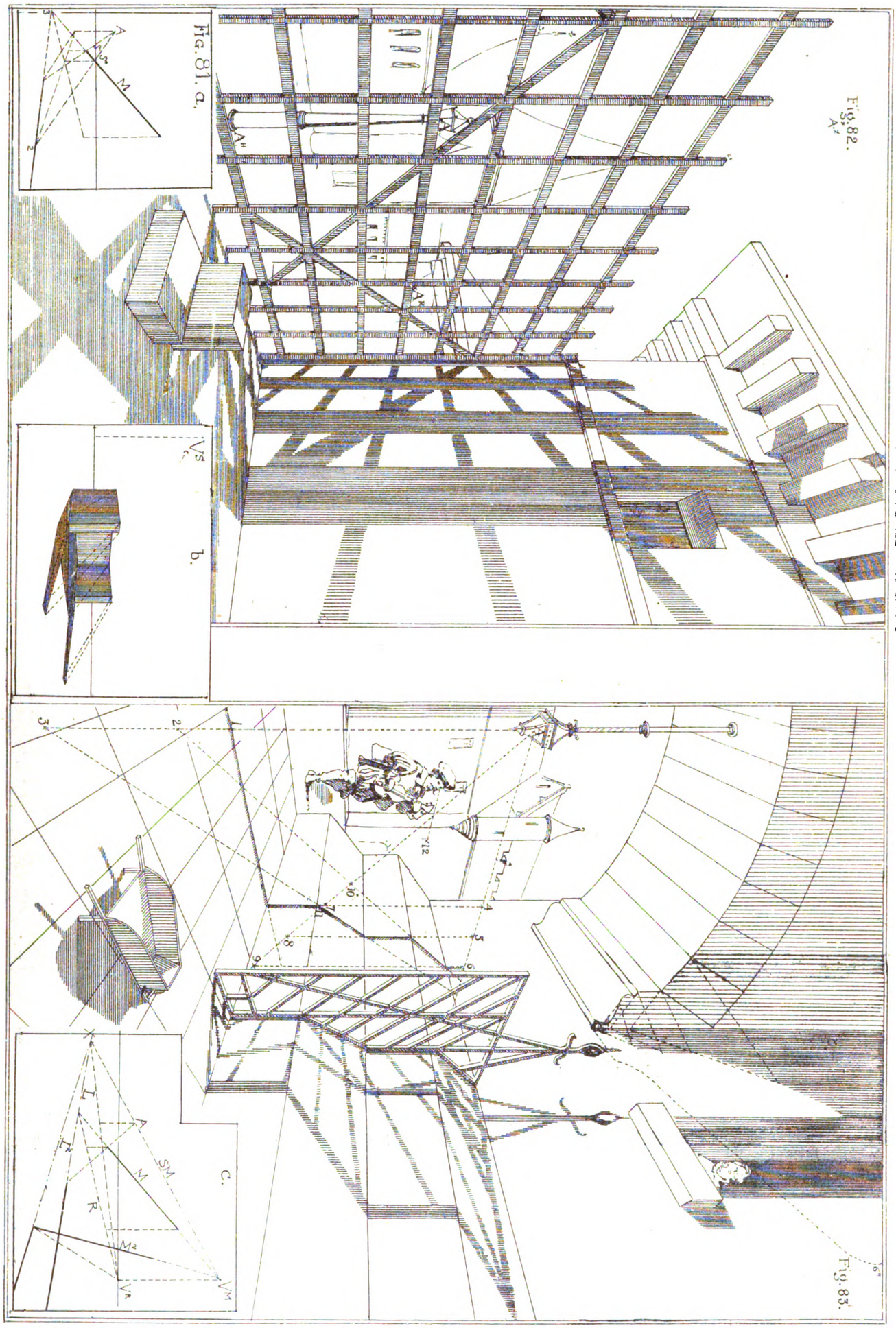
PLATE XVIII. SHADOWS BY ARTIFICIAL LIGHT.



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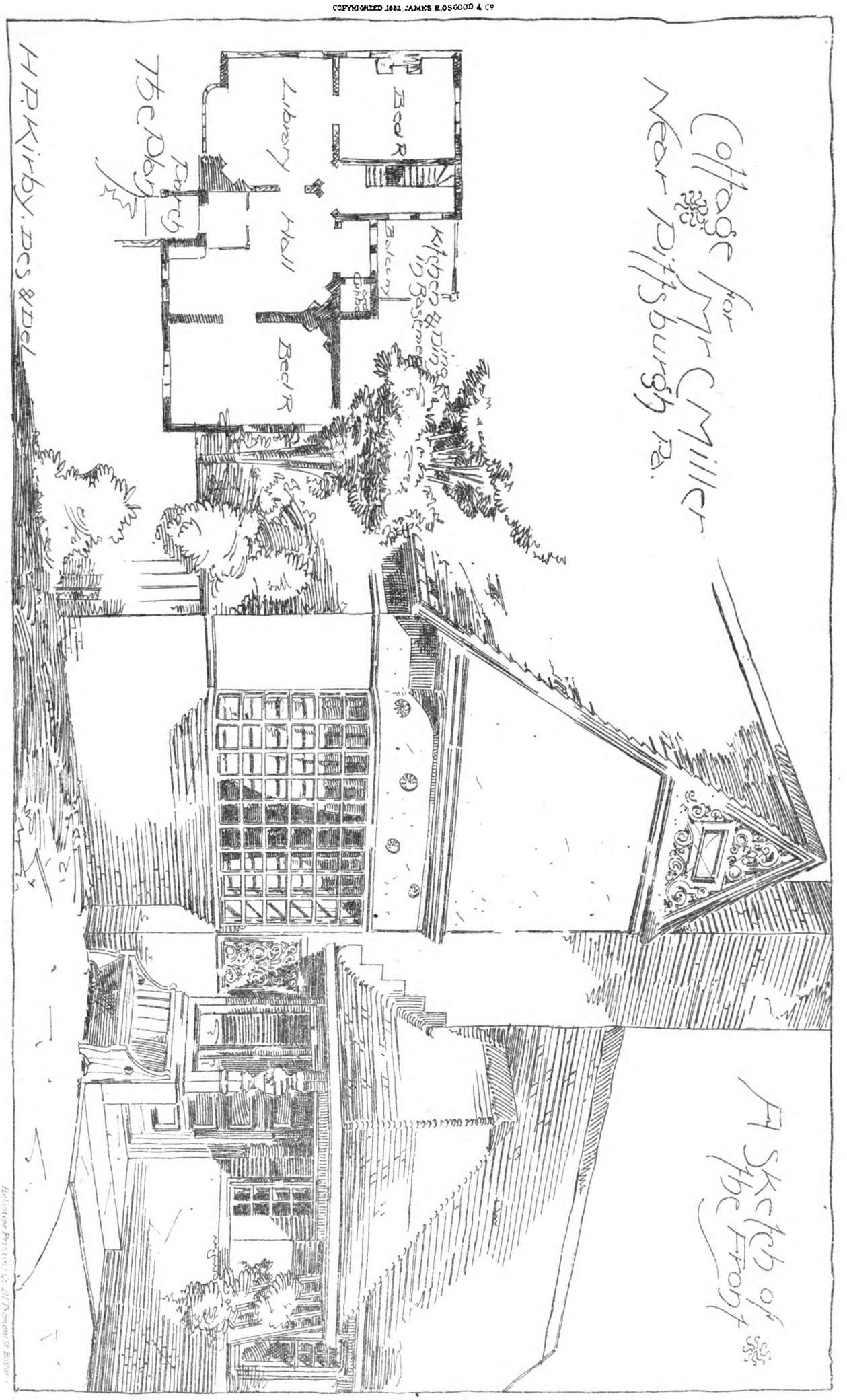

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THE OLD MASTERS OF BELGIUM AND HOLLAND.[1]

TO satisfy those who have known and loved Fromentin's book in the original, a translator must accomplish an unusually difficult task. Surely I am far from alone in my belief that it is the most perfect book about pictures ever written in any tongue — the most clear in aim and expression, the most logical in thought; at the same time the most incisive and the most temperate, the most self-possessed and the most wisely enthusiastic, the most convincing and the most inspiring, the most technical and the most intellectually suggestive. Perhaps its chief virtue is that of *balance:* a virtue too often absent from writing that treats of art, conspicuous by its absence, for example, in the work of such diametrically opposed authors as Ruskin on the one hand and Taine on the other. No other man, it seems to me, has had so clear a perception of both technical and intellectual elements in painted work as Fromentin, and none has kept his head so perfectly while discussing them, or made their charms and value so clearly perceptible to his readers. But Fromentin's book is something more than a wonderful treatise on the painter's art. In style it may not be compared with any book of its class in any language whatsoever. It is a masterpiece of prose writing in a tongue which beyond all others has made of prose writing a fine-art in the truest sense. Artist as was Fromentin with paint and canvas, he was a far more marvellous artist with pen and ink. When we remember that he has often been classed with the four best prose writers of modern France — with Gautier, and Merimée, and St. Beuve, and Georges Sand — above all rivals in a close and vigorous competition; when we remember that though he had written but four small volumes, he would have been made an Academician had not death come first, we may imagine what difficulties his translator must encounter. The technical niceties, the intellectual subtilties of his writing must be transferred to our tongue, less rich in technical niceties and fine shades of meaning than his own. And the charm of his unique style must be preserved as well. This style possesses, to a greater degree perhaps than any other, all the qualities possessed to *some* degree by all good French prose: brevity, grace, simplicity, a rapier-like adroitness, and a fascinating variety of construction. Hence it is in proportion even more difficult to reproduce than that of others. It is this difficulty, doubtless, which has hitherto interfered with the translation of *Les Maîtres d'Autrefois*, in spite of the book's great fame. So far as I know, it has never been published in our tongue till now; at all events there is no currently-known translation, and we should therefore be doubly grateful to Mrs. Robbins for the work she has accomplished. Even had she done but half that work, had she given us only Fromentin's valuable matter, shorn of his delightful manner, English-speaking students would have had cause for gratitude. But she has done more than this. She has produced a sympathetic and charming version which, in spite of certain faults, gives the reader a good idea of Fromentin's peculiar magic. She has caught and reproduced his general tone: that of delicate and graceful, yet keen, earnest and thoughtful conversation. And she has shown remarkable skill in reproducing his short Gallic phrases, neither losing their structure in the long sentences to which English lends itself more readily, nor giving them the clipped, staccato accent too often attendant upon literal translations.

Passing now to details we see Mrs. Robbins in so many cases rendering difficult passages and fine shades of expression with admirable, intuitive accuracy, that we are surprised to find them offset by other passages of careless or blundering interpretation. The phrases I shall cite may seem of minor import to some, who do not appreciate the refinement of Fromentin's workmanship. The vivid pictures he draws for us of an artist's nature or an artist's work are not boldly and strongly outlined, but built up gradually with minute and extremely precise strokes, each telling delicately but perceptibly toward the general result. To alter the meaning of one such stroke is to alter the final impression left upon the mind. No accuracy could be too close, no attention too scrupulous in the translation of such criticism. But it looks as though Mrs. Robbins's blunders were the result of carelessness rather than of want of perception; for, as has been said, she is often extremely successful in very critical places. As an example of a rendering which shows perfect familiarity with her original I may cite a place where colored "*dans la matière ou pardessus*" is written "colored solidly or glazed," and the fact that Mrs. Robbins has felt that "opinion" is often used by Fromentin in a sense which must be given in English by "public" or "popular opinion." Instances of this sort might be cited from every page. But on many pages occur instances of a contrary kind. "*A fleur de toile*" as used of work which has no depth does not mean "flat on the canvas," but "on the surface of the canvas;" "*Grace d' état*" does not mean "state of grace;" "*Moulage*" has no reference to "modelling," but to "moulding;" "*Esprit*" applied to an artist can never be translated "mind." "His genius and his great power" is a different thing from *son génie en sa toute puissance;* and "*richesse sans coloris*" is the exact opposite of "richness of coloring." Comparing Mrs. Robbins's version with her original, line by line, such slips are far too frequent; and, as I have said, the book is one with which such comparison is especially in place. It is in no spirit of captiousness that, while greatly admiring Mrs. Robbins's translation as a whole, I have dwelt upon these blunders. No one who loves his Fromentin can help being distressed by them. can help seeing that the author's thought is marred by every slightest slip from perfect exactness. No one can help wishing, however, on the other hand, that Mrs. Robbins's translation may meet with the success its general merit amply warrants. And if such success attends this first edition, and a second one should follow, I believe that a careful revision of the book on the translator's part would make it an almost perfect English version of its admirable original.

The volume is attractively printed and bound, and the heliotype illustrations serve their purpose in conveying a general idea of some of the chief pictures in question to unfamiliar eyes, though they can make no claim to much artistic value.

M. G. VAN RENSSELAER.

[1] *Les Maîtres d'Autrefois.* By Eugene Fromentin. Translated by Mrs. Mary C. Robbins. Boston: James R. Osgood & Co.

THE ILLUSTRATIONS.

DESIGN FOR SOLDIERS' MONUMENT, HARTFORD, CONN. MR. FREDERICK C. WITHERS, ARCHITECT, NEW YORK.

THE Committee appointed for erecting a monument in memory of the soldiers and sailors from Hartford, who fell or died in the late war, having decided that the memorial shall be in the form of a bridge, the accompanying design was submitted in competition. None of the designs, however, meeting their exact views, they have selected the author of this as their architect to prepare one in accordance therewith.

This design contemplated a bridge of three arches of a total length of 150 feet between the abutments. The monument was intended to be divided into three triumphal arches, the central one being for a carriage-way, and those on either side for pedestrians. The inner faces of the side walls were designed to receive the memorial tablets.

PERSPECTIVE PLATE XVIII. — SHADOWS CAST BY ARTIFICIAL LIGHT.

COURT-HOUSE FOR PRINCE GEORGE'S COUNTY, MD. MR. F. E. DAVIS, ARCHITECT, BALTIMORE, MD.

COTTAGE FOR C. MILLER, ESQ., NEAR PITTSBURGH, PA. MR. H. P. KIRBY, ARCHITECT, ALLEGHENY, PA.

DR. F. SEYMOUR HADEN'S LECTURES ON ETCHING.

INSTRUCTIVE and interesting as these lectures were they could not claim the attention of the listener more than the lecturer himself. His strong personality, his earnestness tempered by sweetness, his refined bearing, his unconsciousness were quite as entertaining as the words he uttered, and his picturesqueness fully equal to that of the etchings which decorated the platform. A racy man is always refreshing; so is one who believes in himself and maintains his ideas with vigor; but a militant spirit must expect to find adversaries. He invariably arouses the susceptibilities of others. Dr. Haden is a brave champion in favor of etching. He tilts fearlessly against the engravers and everything else that savors of dryness. I do not propose to battle for the engravers, who are quite competent to battle for themselves. Every one knows that steel-plate engraving is obsolescent, principally on commercial grounds, though the French Ecole des Beaux-Arts thinks it worth the while to encourage it. The fashion of the hour, too, is for the picturesque—a fashion which may change at any moment. The fact is, steel-plate engraving has certain monumental or classic qualities, with which Dr. Haden is not in sympathy, but which are still highly prized by many Naturally there are hosts of cold, wiry steel-plate impressions, just as there are myriads of careless dissipated-looking etchings. Art is manifold in its expression, as is literature. It is a great mistake to judge it by an immutable canon. What is sympathetic to one may prove caviare to another. Etching has delightful qualities. It is personal and picturesque; Dr. Haden's feelings are for the picturesque; but picturesqueness is but one of many phases, which are commensurate with the ever-varying tastes of man. How fortunate that it is so! The mirth-provoking experiment of enlarging the engraver's interpretation of flesh, drapery, etc., is (as Mr. Koehler has already observed in the *Daily Advertiser*) a double-edged weapon that will cut both ways. Moreover, these ridiculed dots and lines of the burin *do* interpret flesh as the etcher's needle *cannot*, that is, from a statuesque point of view.

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To call the steel-engraver a "manufacturer" is very unjust. Any artistic interpretation — not downright copying, be it understood — calls for *feeling*, which some engravers have shown in a high degree, giving many of the qualities of the original, and something besides. Dr. Haden's own magnificent interpretation of Turner—Calais pier—perhaps the best thing he has done, certainly the most striking — is a fine illustration of the truth of this remark. A Morghen may not be the peer of a Sanzio — but to call him a manufacturer!

One is almost weary of hearing that old bit of sophistry "There is no line in nature." Of course there is not—save where the electrician has adorned her. No more is there any paint in nature. All art is a convention. When people speak of lines, they mean *outlines*. Objects under certain circumstances have outlines, and very definite ones.

Dr. Haden left his audience in a somewhat vague frame of mind as to his opinions on education. He, himself, studied faithfully for many years, partly in French drawing-schools. He recommended a laborious course of training, and then concluded his remarks by anathematizing schools and academies. To emphasize his assertions he cited the pitiable example of the "School of Raphael." Even supposing that Giulio Romano and Pierino del Vaga were pigmies—though compared with many of our popular idols they are giants—one is inclined to ask "How about the schools of Perugino, of the Bellini, of Ghirlandajo?" The "academic" question has been fully discussed elsewhere. No one now-a-days upholds the old, effete, cold, academic style. Americans, in particular, have no reason ever to dread its advent.

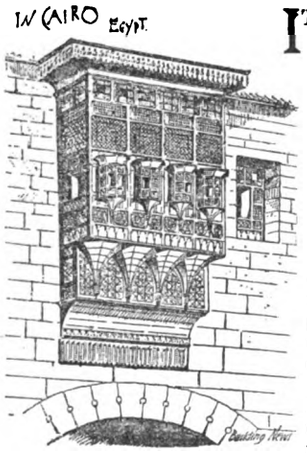
But a pupil must be taught his alphabet somewhere if he would write his madrigals, sonnets, or epics; and where better than in a school which, if conducted by artists of common-sense, would never dream of imposing a cast-iron system on its scholars? At first every one must be imitative, just as Raphael or Titian were imitative. If a student is not robust enough to enfranchise himself eventually, then indeed he must be made of poor stuff. The word "finish" seems to offend Dr. Haden greatly. The truth is a work of art is finished when the idea of the artist is complete. If his idea be sketchy, then his work will be sketchy; yet it will be finished. If, on the contrary, his idea be clearly defined, if it embraces modelling and all the subtleties of the human form, the expression of it must be precise, and it is this precision that calls for a long, sustained effort, only to be made by men of character.

Sketching is almost an art by itself. The whole question of finish can be summed up in these words: *The idea and the expression of it must be co-equal.* It is the exact equilibrium maintained between the conception and the execution that made the Tintorets, Titians, Raphaels, and Michael Angelos of the sixteenth century. When the idea predominates, the work is interesting but imperfect — Blake's work, for instance — all poetry. When the work is superior to the idea, it savors of the work-shop.

What Dr. Haden said of the advantages he had derived — as applied to his etching — from his medical training, from his habit of analyzing effects and tracing them to their causes, should be a strong inducement to tyros to enlarge their scope of information, and discipline their minds.

Frederic Crowninshield.

IN REGARD TO THE ESTABLISHMENT OF A VALID TEST OF PROFESSIONAL ABILITY.[1]



IT were most devoutly to be wished that this subject were in abler hands, but it is hoped that the suggestions herein offered may incite advantageous discussion and result in suitable action if deemed worthy.

The suggestion is offered for your consideration, the establishment of a Board of Examiners composed of gentlemen eminent for their professional attainments, whose duty it shall be to ascertain by *rigid examination* the *qualifications* of candidates for *degrees*, with the vested right to grant diplomas in accordance with the rank and standing of such applicants.

Why the necessity of such action? If there be a necessity, then what manner of men arise up with the right to construct such a board? First, as to the necessity: in every profession there is more or less of the evil of malpractice to contend with, but that of architecture seems to have more than its quota, for the reason that there is no established authoritative defense whatever.

Most professions are protected to a considerable extent by examinations and diplomas, and with a proper diploma one is armed with authority to practice; in most instances this authority establishes the confidence of clients and the practitioner moves onward and upward "*mens sibi conscia recti;*" while those who are not thus provided are obliged to sneak through the world self-upbraided impostors sooner or later exposed — the public thus cautioned and the particular profession indirectly benefited by such exposure. Not so with architecture; in the present order of things (or more properly speaking *dis*order) *our* profession is comparatively unprepared to resist attack, is unable to meet opposition and has no security against "foes within the ranks." There is no law, rule or usage by which designing men may be commanded "thus far shalt thou go, no farther." A man (generally a young and ambitious one) tired of home and anxious to improve, is desirous of adventure; armed and equipped with perhaps a shoemaker's kit or a set of tinker's tools (or other equally proper and suitable architectual traps and accessories) and possibly a piece of chalk, together with plenty of assurance, he moves out into the country to seek his fortune and to grow up. Well, if nothing offers in the way of honest employment at cobbling or the restoration of dilapidated tin-ware, then as a *dernier ressort*, and not being particular or proud, this inevitable and irrepressible genius falls back on the piece of chalk, puts out his shingle as "So and So, Architect," and in too many cases succeeds, *i. e.*, succeeds in heaping dishonor upon a worthy but unprotected profession. This may seem a somewhat exaggerated character of co-worker, yet many or most of you have undoubtedly met instances almost if not quite as bad as this. I have known several that were worse, for the fellows were minus the before-named tools, etc., and had only the impudence and irrepressibility; but what they lacked in one respect was fully made up in the other.

In almost every town and hamlet in the land there is a greater or lesser number of these untutored pretenders, men who were never taught, and never acquired even the rudiments of the science; who are unfamiliar with a single principle upon which it is based; who know nothing whatever of the history of architecture or the peculiarities of orders or styles; nothing of the elements of design, nothing of decent, not to say proper construction. There are others a shade more advanced, who perhaps have been in an architect's office, and after a few months' destruction and waste of stationery therein, have graduated and gone out into the wide, wide world, full-fledged with cheek, tongue, and impudence; who call themselves architects, and

> "do botch and bungle up
> With patches, colors, and with forms."

Of such are the pseudo co-operant forces; their name is legion, and as one is adjudged by the company he is in, the public, looking upon every one as an architect who styles himself such, naturally charges any incompetency to the profession at large. Modesty bespeaks merit, but sometimes merit is so exceedingly modest as not to speak at all; hence the charge too frequently goes unanswered.

The question arises then, what may be done in the premises? We submit that the suggestion initiatory of this paper will to a great extent meet the demands. It is not desired or deemed indispensably necessary, perhaps, that one should be thoroughly versed in every department of the science before he shall be able to commence practice; but we submit that the limit and extent of practice should be held strictly in accordance with a degree granted by proper authority, and one should continue in this degree until proficiency entitles him to advancement. There should be, we think, a certain number of degrees arranged, graduated, and determined upon by this board, and careful examination made in each. It is suggested that these degrees include among other acquirements a thorough knowledge and familiarity with *Classic Architecture;* this is an all-important and absolutely necessary foundation for the proper and successful study of architecture. True and standard proportion is here to be found (not to raise the question of beauty of detail); in it is the soul and sentiment, the true and fundamental element of design; the correct theory of proportion; it is to the student or practician what anatomy is to the sculptor. Without a knowledge of the situation, structure, and economy of the different parts of a body, the sculptor is not properly able to give true expression to a face or form, nor to produce a gracefully draped figure; in like manner, to the architect a knowledge of classic architecture is the underlying and governing principle of design.

Besides a proper standing in this branch, there should be a due amount of information as to styles and purity of detail outside of the orders; construction, materials, their strengths and methods of application, a general knowledge of mechanical work in the various trades, sanitary conditions, drainage, ventilation, acoustics, heat and light, preparation of various grounds and foundations — in short, a general and practical familiarity with the numerous and varied branches and parts which necessarily combine to form a thorough knowledge of the science or art of good, proper, and correct building. Candidates should pass examinations with credit; and degrees with diplomas, conferring the power and authority to practice in accordance with the standing adjudged, should be granted to those who have worthily passed to the required grades of such degrees.

This requirement for honorable practice is not too exacting; those who cannot creditably pass such an examination are not fit to be entrusted with works involving an outlay of capital and a risk of life and limb; if something of this kind may be thought advisable, and is put into execution, we think that even members of the profession who already possess acknowledged ability, will not object to, but will favor, rather, the endorsement of good authority, and incompetency will be marked and held at bay. The public may then be apprised, and may engage those who are vouched for as skilful, or themselves

[1] A paper by Mr. A. C. Nash, read at the Sixteenth Annual Convention of the American Institute of Architects.

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be in a measure to blame for any failures through the employment of incompetent persons.

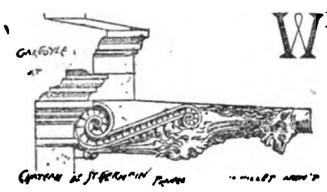
Now, if there be a necessity for a movement in this direction who shall be the appointees of said Board? The answer—Who may more properly act in such capacity than those of acknowledged ability within the body of the American Institute of Architects?

This is the largest and most important collective body of architects on this continent. The objects of this Institute, as declared and adhered to, are "to unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession." Argument seems unnecessary to sustain the proposition that the Institute would be the proper authority, and that if a move should be made in the direction suggested, it should emanate from this source.

We would also respectfully suggest in this connection that the number of the F. A. I. A. should not be limited to seventy, as at present. We think that there should be no limit; the gates of this Institute should be "gates ajar," for the free ingress and welcome of all such as apply, and are worthy and well qualified, and for the gentle egress of those who are not, if any such there be. We would not for a moment be understood to insinuate that there is a doubtful member; far from such thought; we believe that gentlemen of the Institute would not object to this examination, and its accompanying endorsement; but if this body of architects should decide to establish a board as suggested, the law of self-preservation would dictate self-examination, and it would become its first duty to so act as to be able to stand entirely above suspicion; it should act firmly in accordance with the spirit and letter of that teaching, which commands: "If an eye offend thee, pluck it out."

Again, as regards the number of Fellows, we respectfully urge that none who are properly qualified should be kept out; all laudable effort should be made to increase the membership; there should be no isolation of the component parts of the general machinery; there should be the combination of a perfect whole; thus the machinery may be set to working for the achievement of the greatest results. In all things, in every phase of existence, in things animate and inanimate, from materiality to mentality, from things to thoughts, in unity there is strength; in combination there is power; with intercourse and interchange of thought there is enhanced ideality.

THE PROGRESS OF DECORATIVE ART.[1]



WE may, I think, without rashness, congratulate ourselves on the progress made in decorative art of late years. I should be loth to speak slightingly of any of the brotherhood to which I belong, past or present, but the plain fact is that some twenty-five years ago these arts of mere decorations were in such a state that one is bound to say that they looked as if they were coming to an end; of the traditional part of them there was, in England at least, scarce any more left than there is now, *i. e.*, nothing. On the more obvious and self-conscious side there was nothing stirring. What individual talent was left could only show itself in eccentricities that most often deserved to be called by any other name rather than decoration. The public was as blankly ignorant of the history of the art as the designers were of its first principles. The contempt with which the whole subject was treated in those days is shown pretty clearly by the law which relates to the copyright in industrial designs, which, strange to say, is to this day all the protection accorded to them. The framers of that law doubtless wished to secure to manufacturers all reasonable advantages for those designs which they had paid for or invented; yet to this day it is only possible to protect such designs for three years. Three years seemed at the time when that law was made ample time for a manufacturer to reap all advantages from any design he might produce. I don't think I need make much comment on that. Well, really, I must say that twenty-five years ago it did not much matter whose design you got hold of. They were all much the same, and did little but spoil the materials out of which they were made. I well remember when I was first setting up house, twenty-three years ago, and two or three other friends of mine were in the same plight, what a rummage there used to be for anything tolerable in the way of hangings, for instance, and what shouts of joy would be raised if we had the luck to dig up some cheapish, commonplace manufacture, which, being outside the range of fancy-goods, had escaped the general influence of the vacuity of the times. On the whole, I remember that we had to fall back upon turkey-red cotton and dark-blue serge; since even the very self-colors of fancy-goods had grown to be impossible, which is the more inexcusable as at that time the beneficent march of science and commerce had not yet destroyed the ancient and worthy traditions of the craft of dyeing, as it has since done. This last sentence shows itself to me like the skeleton at the Egyptian feast, and reminds me that I have something else to say than self-satisfied triumph over our advance on the blank nothingness of the first half of the century. Yet certainly that advance has been made: a reaction from ugliness to beauty has touched at least some part of the people who live among civilization, and in what we technically call the decorative arts this new Renaissance has been helped in this country by many agencies, not least among which has been the steady endeavor on the part of the Department for Science and Art to spread artistic education among the public in general. Some of the results of this new Renaissance are now before the people of this great city, and I think I may say that they fairly represent what has been done in the arts of decoration since the change I have been speaking of took place. Nor am I ashamed, in the name of my brethren in the craft, in the first place, to beg some tenderness from the public for our shortcomings, considering the difficulties we have had to fight against; and in the second place to remind them that things have changed; that no young housekeeper need now take so much pains for such a scanty result as I had to do in 1859; that any one can now find in shops all over the country goods at commonplace prices which both intend to be and are beautiful, and more or less marked by artistic individuality; that, in short, any one who chooses can make the interior of his house comely and pleasant without an unreasonable expenditure of time and trouble.

Now, I will not ask my craft-brethren to be content with my using no greater words in praise of our noble selves than these, which after all do seem to me to imply great encouragement to us all; for something more I have to say before I sit down. I am always asking myself is this apparent success real—is this seeming advance of a quarter of a century going somewhere or nowhere? That is a serious question, to which it is impossible to answer aye or no. But, after all, to us as practical people it does not matter much whether it can be answered directly always, so long as we see clearly what are the conditions of the health or disease, the life or death of our art—in short, so long as we can see what work is immediately ahead of us to maintain our art in a hopeful state. Now, to my mind, it is not so very difficult to see this. First, we have, to put the matter in its simplest form, to interest the whole public in the work. First, and indeed last, there is nothing else for us to do; that once done, the whole public will see to this matter. Well, that is easy to say and very hard to do—short to say and very long to do, and yet we must set to work about it unless we æsthetic upholsterers are content to be what I am afraid many people think us, contemptible waiters or mere pleasure-seekers and triflers with life. For in truth these decorative arts, when they are genuine, real from the root up, have one claim to be considered serious matters, which even the greater arts do in a way lack, and this claim is that they are the direct expression of the thoughts and aspirations of the mass of the people; and I assert that the higher class of artist, the individual artist—he whose work is, as it were, a work in itself,—cannot live healthily and happily without the lower kind of art,—if we must call it lower—the kind which we may think of as co-operative art, and which when it is genuine gives your great man, be he never so great, the peaceful and beautiful surroundings and the sympathetic audience which he justly thinks he has a right to. If you compel a Michael Angelo to live in a world of dullards and blunderers, what can happen to him but to waste his life in ceaseless indignant protest, till his art fades out in sour despondency and his whole career has turned out a useless martyrdom?

Great minds need no slaves to rule over, but rather fellow-workmen whom they can help and be helped by. So I say that the decorative arts are as necessary to our life as civilized men, nay as men, as the more strictly intellectual arts are, and that that which has become our end and aim, to wit, the new birth of popular art, as on the one hand it is a most arduous, so on the other it is a most worthy undertaking. Such great works both make the utmost courage necessary and inspire us with the necessary courage for carrying them out. Striving to arm myself with that courage, I will venture still to try to tell you what seem to me the chief difficulties that we have to face in our undertaking, and will beg you also to be courageous in listening to my few last words; since courage, as you well know, is the very mother of kindness and good nature. Well, once for all, I am afraid I must admit that the public in general are not touched at all by any interest for decorative art; a few of the upper and middle classes only have as much as heard that there is such a thing as decorative, which should be popular, art. How could it be otherwise? Consider! That lapse of all the arts of decoration that I began by speaking of, and which got to such a pitch at last that it became unbearable to some of the cultivated part of our population, this paralysis of the art was brought about by commerce (so-called) forbidding the exercise of art as an essential part of manufactured wares. Time was when all manufactured wares had some claim to beauty, and other things being equal, the most beautiful thing was the most marketable. I fear we cannot say that this is the case now. Pray excuse me for drawing an illustration from a very interesting and useful class of goods to which we are none of us strangers—printed cottons. If you turn over the pattern-books of this or that cotton printer in this city, you will find many patterns which are exceedingly pretty, while some of them are exceedingly—well, ugly, as, I am sure, the gentleman who prints them will admit. Now, having the honor of the acquaintance of a cotton printer in this city, I am able to say that, so far as I could understand, the ugly patterns sell quite as well as the pretty ones. Now, you know, if the decorative arts were in a healthy condition, instinctive good taste would refuse the

[1] By William Morris. An address delivered at the opening of the Fine-Art and Industrial Exhibition at Manchester, England.

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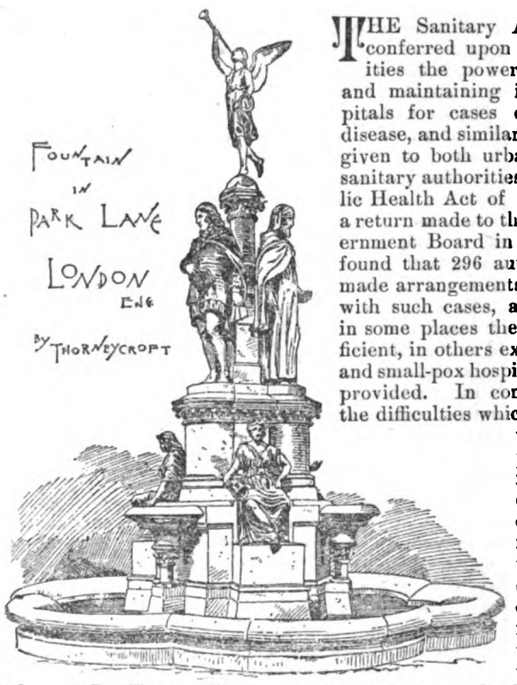
ugly patterns and demand the pretty ones, and so prevent what I must consider a degrading waste of money, time and intelligence; for what in its way can be more wasteful than using all the accumulated knowledge and skill of centuries in spoiling the fair white surface of a piece of cloth by putting a pattern on it which you know to be ugly. And in like manner it fares with all the other industrial arts. If a manufacturer determines to be also somewhat an artist (as he most certainly should be), and to turn out nothing but what may do credit to his own reason and intellect, he must also make up his mind to give up a great part, probably the greatest part, of his business; and I will say at once, before I go farther, that if a good few of our makers of common wares were so much touched by the importance of the decorative arts of England as to do this, it would make a new era in that advance of the art which I have been speaking of; and if we could add to such a sacrifice of apparent welfare an obvious and lively interest on the part of the public in the processes and methods of the art, I do think we should be nearing our goal. For at present the divorce of commercial manufacture from art has made the public bad marketers; too often they don't know what they are buying. Often I have had it said to me when I have been showing my friends some process of designing or making a piece of goods, "Dear me, I had no idea that all that trouble was necessary." In short, it seems to be generally believed by a people, to my mind, somewhat overdone by machinery, that works of minor art can be and are turned out like the sausages in the mythical Yankee machine — live pig at one end, sausages at the other. Whereas in truth every work of art, however humble, as on the one hand there has gone to make it a real human pleasure of body and mind, so on the other every stage of its making has been attended by painful care, anxiety, and chance of failure. And this it is, this play of hope and fear, joy and sorrow over it which makes it what we call a work of art; indeed we may well call it a work of nature also.

The divorce of commerce from art has been wasteful of more than the works of man's industry, and in many places, and I must say nowhere more than in South Lancaster, has made the advice which we must always give to all students of art to go to nature somewhat of a mockery. Believe me, I do not speak of this or any other evil wantonly, but with the hope of, in my small way, encouraging those who are fighting against it; and indeed fight against this evil we must, if we are to have decorative or any other art for long. The choice lies before us, which will you have, art or dirt? In the long run I believe you will find art cheaper of the two commodities; for if we choose dirt we shall make England, all of it sooner or later, what it was not meant to be, an uncomfortable country, and discomfort breeds discontent, and discontent — what will that bring forth in this land of stout-hearted men? This is far from being beside the question; it is English decorative art I am speaking of, and can we forget what the country is like which bred that art as it once was, which has made an ancient English house, for all its simplicity and rudeness, the loveliest of the habitations of man? Surely my voice is speaking the thoughts of many people when I plead with the mighty and overwhelming commerce of England to spare the source from which all English art has sprung, what is left us of the land of England, with all its growth of familiar beauty, sweetened, every acre of it, with the memories of the men that made us. When that plea is listened to, and we make up our minds, first, to keep all we have left us of fair and unspoiled country and dwellings, and second, to replace what we have lost by a reasonable and living art which shall really express our lives and their aspirations — I say when we have made up our minds to do this, then is all gained.

Nature, which has covered with her kind hand the battle-fields of the Edwards and Henries and Charleses, will in one way or other, when we call upon her, do no less for the battle-fields of commerce. Our scientific men who, — to me, an outsider, — seem able to do anything they care to do, will have shown us the right use of carbon and sulphuric acid, and the sun will shine as brightly through the boughs outside the factory windows in Lancashire as it does through the Kentish hop garden. I think those days will come, wild as the prophecy seems. We shall not see them. Who cares, since we amongst others shall have worked to bring them about? Nor will anybody in those days need to talk about English decorative art, for every one will have it ready to his hand; like the company of a friend with whom one can talk if one wills, or be silent with if one pleases, so restful, so familiar shall it be.

Novel House-Warming Apparatus. — Professor E. S. Morse, of the Essex, Mass., Institute, has devised an ingenious arrangement for utilizing the heat in the sun's rays in warming houses. His invention consists of a surface of blackened slate under glass, fixed to the sunny side or sides of a house, with vents in the walls so arranged that the cold air of a room is let out at the bottom of the slate and forced in again at the top by the ascending heat column between the slate and the glass. The out-door air can be admitted also if desirable. The thing is simple, and its entire practicableness has been demonstrated, it is said, in the heating of the Professor's study in his cottage at Salem. The value of the improvement for daily warming buildings like churches and school-houses, which, when allowed to get cold between using, consume immense quantities of heat before they are fairly warmed again, is evident. Of course any other means of heating is available when the sun does not shine.—*N. Y. Tribune.*

HOSPITAL CONSTRUCTION.[1] — I.



The Sanitary Act of 1866 conferred upon local authorities the power of erecting and maintaining isolation hospitals for cases of infectious disease, and similar powers were given to both urban and rural sanitary authorities by the Public Health Act of 1875. From a return made to the Local Government Board in 1879, it was found that 296 authorities had made arrangements for dealing with such cases, and although in some places they were insufficient, in others excellent fever and small-pox hospitals had been provided. In consequence of the difficulties which arose from want of experience and from prejudice, the Local Government Board found it necessary to obtain accurate information about those hospitals, and Dr. Thorne Thorne was instructed to make inquiries into the conditions by which the greatest usefulness was attained. He inspected 67 hospitals of every variety of size and construction in England and Wales, and in the following report Dr. Thorne has summarized in a compendious form the lessons which have been learnt during his lengthened investigation: —

Where the shape of a site and the necessary conditions attending the arrangement of the buildings have permitted of choice, it has under most circumstances been found desirable that the opposite side windows of the ward-pavilions should as nearly as possible respectively face somewhat to the south of east and to the north of west, and that any departure from this rule should be in the direction of a south-easterly and north-westerly aspect, rather than in that of a south-westerly and north-easterly. By this means both of the side walls of the hospital wards are in turn brought under the influence of the sun's rays, a large amount of daylight is secured, the spaces between any two or more parallel pavilions become well warmed and lighted, and, at the same time, direct exposure to the east wind is avoided.

The necessity of having every site so effectually enclosed as to prevent any communication between persons in the hospital and those outside is obvious, and a spread of infection to the outside public was in several instances ascertained to have been due to the imperfect manner in which this had been carried out. As a rule, a substantial wall or close fence at least 6 feet 6 inches high is found necessary for this purpose.

The more efficient hospitals for infectious diseases, which have been provided by sanitary authorities in order to meet the wants of their districts, have under ordinary circumstances consisted of (1) an administrative block; (2) at least four wards, in two separate pairs, and in which patients of both sexes, suffering from two different infectious fevers, can be simultaneously treated; and (3) certain out-buildings, such as wash-house, mortuary, etc. These buildings have been either permanent or temporary. As regards permanent buildings attention to the following points has been found necessary.

The administrative block is nearly always so constructed that the offices and apartments it contains are in excess of the requirements of the permanent ward buildings, and are hence adapted, without having recourse to further erections, to the wants of such permanent or temporary extensions as may at any future date become necessary. Having regard to economy of space, it has as a rule consisted of more than one story; and in its general construction the rules and regulations governing the erection of good modern dwelling-houses have been observed. The accommodation it affords must necessarily vary very much according to circumstances, but as a rule it has been found to contain adequate accommodation for a care-taker and his wife, or for a matron when a porter or other male servant is maintained on the premises; a kitchen, together with scullery, larder, pantry, etc., so fitted as to serve the requirements of all the hospital inmates; sleeping accommodation for nurses and staff, that for nurses being, in most cases, on an upper floor, where those who are at work at night may rest by day without being disturbed; a medical officer's room and dispensary; bath-room and closets for the staff, etc. In larger hospitals it is also found necessary to make provision for the accommodation of a resident medical officer, and to provide a mess-room for the nurses and staff. The ad-

[1] From the *Architect.*

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ministrative block is always either completely detached from the ward buildings or it communicates with them by means of a passage, either in part or in whole open at the sides, so that a cross-current of air may pass between the respective buildings. It is also, as a rule, so placed with regard to the entrance to the hospital premises that visitors or other persons can enter it without passing the buildings containing the wards.

The ward buildings which have been met with in so-called permanent hospitals have been constructed either of brick, stone or concrete, alone or in combination, or of corrugated iron, or again of wood. By far the majority have consisted of brick, with stone or glazed colored-brick ornamentation; some, as at Bradford, are throughout of stone, lined with brickwork; and in one instance — namely, in the Weymouth port district — very excellent results have followed the use of concrete. Corrugated iron is not in frequent use; it has generally been resorted to when an effort has been made to cope with a threatened or an existing epidemic; the buildings have been hurriedly erected and the result has not been satisfactory. Even when the iron has throughout been lined with match-boarding, it has often been found impossible to keep the wards sufficiently warm in winter, or sufficiently cool in summer, and it has in some instances been deemed risky to use them at all during the colder season of the year. One of the better examples of iron buildings which were met with is that at Southport, but there was no available information as to the temperature at which its wards could be maintained in winter.

Of the wooden ones much the same may, as a rule, be said. Nearly all have been erected under the influence of panic, and hence they have generally been very imperfect in point of construction. But even where the walls, as also the wooden or tiled roofs have been well lined with match-boarding, a space of some 5 or 6 inches, either filled in with sawdust or not, thus intervening between the outer and inner layer, it has during the winters of 1879–80 and 1880–81 been, as a rule, found impossible at all times to maintain within them a sufficiently equable or sufficiently warm temperature, even when the fireplaces were good as regards both construction and position, and when the window surface and the means of ventilation into the outer air have been by no means excessive.

At Nottingham, where the two layers of wood forming the walls are 6 inches apart, the interspace being filled in with sawdust, it was on one occasion found impossible, even when large fires were maintained night and day, to raise the temperature near some of the beds beyond 32° Fahrenheit; in the Alcester rural district, where there is a very similar building, the temperature was found in the winter of 1880–81, and under the same conditions, to fall to 38° Fahrenheit; in several such hospitals I heard of water freezing near the beds of patients; some are designedly not used in winter weather; and in one instance one of the more substantially constructed wooden buildings was closed during a recent winter because it was believed that the death of two patients had been brought about by the low temperature which it had been found impossible to obviate. In some of the more solid wooden constructions, as at Birmingham and Oldham, so low a temperature has evidently been avoided, but in neither of these districts was I able to procure thermometric observations as to ward temperature. Having reference, however, to the experience which has been acquired, I cannot but conclude that, as regards permanent hospitals in this climate, wooden and iron buildings as ordinarily constructed are not, as a rule, well adapted to the purposes of wards. That they can be constructed so as to ensure a reasonable and a fairly equable ward temperature I do not doubt, but when so constructed, their original cost would probably not fall short of, if it did not indeed exceed, that incurred in the erection of ordinary brick buildings; they would be less durable than these, and the cost of maintaining them in a proper state of repair is undoubtedly greater than that needed for the maintenance of the more substantial structures.

Having regard to the desirability of securing surfaces which are easily kept free from dirt and infection, and which dry rapidly after being cleansed, it has appeared to me that wooden-lined wards are not adapted to the varying needs of a permanent building, especially in cases where the several sets of wards cannot always be reserved for the same diseases. On the other hand, no information has been forthcoming during the course of my inquiry tending to show that wards composed of the more permanent materials, but which are well constructed, well ventilated, and well administered, became in process of time less fitted for the reception of the sick than they were when first erected.

By far the majority of hospitals visited had all their ward accommodation on the ground-floor, an arrangement clearly the most convenient for administrative purposes and also possessing other advantages. Where, however, a site was necessarily limited, there was advantage in the hospital buildings being of two stories, and having a belt of unoccupied land around them in place of being of one story only and covering the site up to, or nearly up to, the limit of the ground. The former plan allowed of something in the shape of airing grounds being provided, besides favoring such reasonable distance between the hospital and neighboring roads and houses as is desirable for the purpose of giving confidence to the public and of reducing any real risk there may be from the proximity to the hospital. Where these conditions have been complied with and where the wards on both floors, as also the buildings generally, were well ventilated and well administered, I was not able to learn of any experience tending to show that such an arrangement had in any way acted prejudicially.

Instances were, however, met with which tended to show that in the interests of the patients themselves, and this even where a site was properly chosen, any such overcrowding of buildings, or of patients, on site, as could either hinder or interfere with the purity of the air entering the ward windows should be carefully avoided. Especially did it appear necessary so to arrange the buildings as to prevent the possibility of dead-house, laundry, kitchen, and neighboring ward emanations, from interfering with the purity of the air surrounding the patients. So also disregard of the chance of offending or injuring neighboring dwellings by reason of the proximity of the hospital buildings to them was found in some cases to have led to much inconvenience and to subsequent expense.

Among the hospitals visited, and where these several necessary conditions have been fulfilled, I would name those in the Bradford, Cheltenham, Tonbridge and Warrington urban districts, in the Berkhampstead and Solihull rural districts, and that belonging to the Weymouth port authority. In none of these instances does the number of patients per acre exceed twenty. As typical of the reverse conditions the wooden pavilions at Birmingham, which are deemed to suffice for the purposes of some seventy patients per acre, and the three-storied buildings at Salford, where some sixty-five patients per acre are accommodated, may be specially noted.

MONTHLY CHRONICLE.

NOVEMBER 1. The Alhambra Theatre, (a low resort) New York, N. Y., is burned. There had been no performances in it for a week.

November 2. Sharp earthquake shock at Valparaiso, Chili.

November 3. False alarm of fire causes a panic in the Brooklyn Academy of Music. No one hurt.

Burning of a variety theatre at Baltimore, Md., at 3 o'clock A. M. One life lost.

November 4. During a political caucus in the town-hall at Rochester, N. H., the floor gives way. One person seriously hurt.

November 5. Slight earthquake shock at Guayaquil, Ecuador.

November 6. A fire at the Theatre Comique, Providence, R. I., just before the play, is put out by automatic sprinklers.

Burning of the Provincial Poor Asylum, Halifax, N. S. Thirty-one persons burned to death.

November 7. Slight earthquake shock felt at Laramie City, Wyo. T.

November 8. A powder-mill containing six tons of powder is blown up at Windsor, Ont., Canada. One life lost.

A typhoon does great damage to Manila.

November 10. A magazine near Troy, N. Y., containing four tons of powder, explodes. No one hurt.

Cyclonic storm near Des Moines, Io.

November 12. Panic caused in St. Lawrence Catholic Church, Eighty-fourth St., New York, by the falling of a portion of the ceiling. No one seriously hurt.

November 16. The theatre at Gross Becskerek, Hungary, is burned through the overturning of a kerosene lamp. Many persons injured during the consequent panic.

Several persons are killed by the collapse of a building in the City of Mexico.

November 17. Nine children are burned to death in a school-house near Quimper, France.

Explosion of dynamite works at Llandley, Wales. Five men killed, nine injured.

November 20. A powder magazine near Guayaquil, Ecuador, explodes, destroying a church and several houses.

November 30. Burning of the opera-house at Metropolis, Ill.

FIRE-PROOF SHUTTERS.

PHILADELPHIA, December 4, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Being a subscriber for the *American Architect and Building News*, I take the liberty of asking you for information.

Will you be so kind as to let me know by return mail what is the best filler for fire-proof shutters? I propose to make them of $\frac{1}{8}$"-iron 2" thick, and would like to know what is the best material to fill up the space with.

By answering early you will very greatly oblige,

Yours respectfully, J. W. A.

[IF circumstances lead you to prefer iron shutters to wood encased with tin, we believe that you will find mineral-wool a satisfactory filling. We are inclined, too, to believe that a lining of the porous "terra-cotta lumber," now made in New Jersey, would prove a satisfactory filling. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

A RAJAH'S THRONE OF GOLD. — Although the power of the native Rajahs has declined, there appears to be no corresponding falling-off in the splendors by which they have been accustomed to surround themselves. The *Hindu Patriot's* correspondent at Burdwan states that a splendid throne of gold has just been prepared by two native artists of Calcutta for His Highness the Maharaja. The names of the artists are Harokumar Roy and Kamulkumar Roy. There are 7,000 tollahs of gold in the throne (the "tollah" is nearly half an ounce Troy), and it is exquisitely decorated with vignette-work on all sides. On the top of the back there is the Maharaja's crest, surmounted with magnificent jewels of great beauty. It is added that the throne does great credit to native workmanship. —*London News.*

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Discovery of an Ancient Tunnel at Samos. — The *Academy* brings a communication by George Dennis confirmatory of the accuracy of an interesting statement of Herodotus (iii., 60). The Greek historian, speaking of three wonderful works executed by the Samians, places the following foremost: "A tunnel through a mountain 150 fathoms high, cut from the base upward, with openings at both ends. The length of the tunnel is seven stadia, the height and width eight feet each. Through its entire length is dug another channel, twenty cubits deep and three feet wide, in which the water of a copious spring is conveyed through pipes to the city." Some attempts at discovering this aqueduct were made many years ago, but with uncertain success, the identification being far from convincing. But, a few months ago, a Samian priest, by unearthing some stone slabs at the depth of about six feet, disclosed a channel sunk in the rock, half-way up the mountain-side on which the ancient city was built. He followed the course of the channel, by opening pits at short intervals, to the base of the rocky height at the west end of the city. "On clearing away the débris at this spot, it was found that the channel penetrated the hill-side in a tunnel, the mouth of which was a narrow passage, just high and wide enough for a man to pass through, paved with slabs, flanked by masonry of small polygons, and roofed overhead by the leaning-to of the upper blocks on each side." Mr. Dennis, in a hurried visit to Samos shortly after, repaired to the spot, and on passing through the opening in the mountain found himself, after a few paces, in a much wider passage roughly hewn in the rock, and about eight feet high and wide — the dimensions stated by Herodotus. Through the centre of this tunnel was sunk a narrow channel, barely three feet wide, and, as the traveller was told by his guide, ten metres deep, which closely corresponds to the twenty cubits of Herodotus. He was also informed that the tunnel ran thus through the heart of the mountain for 1,270 metres, expanding at the further end into a spacious chamber. This length of 1,270 metres differs from the seven stadia of the historian only by about thirty yards. The height of the mountain pierced by the tunnel is given in the Admiralty Chart No. 1530 at 747 feet, which also agrees tolerably well with the round 900 of Herodotus, whose measurement was undoubtedly based only on sight. "As there is no water in the narrow channel nowadays, and no traces of the spring within the tunnel, it probably communicated with open channels in the mountain slope, through which water from the heights to the north or east was conveyed through the tunnel to the city on the south of the range."—*N. Y. Evening Post.*

The Temple of Antoninus Pius, Rome. — "The once magnificent temple of Antoninus Pius," says a Roman correspondent of *Galignani*, "whose remaining peristyle of Corinthian columns on the Piazza di Pietra still strikes the spectator with admiration, has been lately adapted to public use as an exchange and chamber of commerce, in which capacity it was solemnly inaugurated October 16, in the presence of the minister of commerce and other functionaries. The Archæological Commissioners of the municipality having decided that the columns shall be freed from the masonry façade in which they have been hitherto walled, the work is being actively carried out."

London and the Electric Light. —The *Pall Mall Gazette* says: — It will cost £14,000,000 to lay down the requisite plant to supply the whole of London with the electric light. If all the towns in Great Britain and Ireland were to demand to be supplied with the new illuminant, the capital outlay required would be £64,000,000, not including £16,000,000 for lamps and internal fittings. After this expenditure had been incurred the relative cost of electricity to gas of the same illuminating power would be as 29 is to 22. These figures are taken from the calculations which Dr. Siemens laid before the meeting of the Society of Arts last night. The enormous initial outlay, to say nothing of the hazardous nature of the enterprise and the extreme uncertainty concerning the ultimate development of electric lighting, ought to prevent any municipality from applying for powers to light the whole or even part of their area. It is the money of speculators, not that of ratepayers, which should be squandered on such experiments. Notwithstanding all warnings, however, some unfortunate corporation will probably have to be ruined before the others learn that they should no more undertake the responsibility of introducing the electric light than they should spend the corporate funds in buying Turks or Mexicans — a much less hazardous investment.

Bearing the Idol Market. — A Japanese paper having learned of the craze among Europeans and Americans for works of art from Japan, including the Buddhist and Shinto images, suspects that missionaries sent to that country decry the use of images for the purpose of "bearing" the market. The cunning foreigners send the missionaries to decry the popular religion, and when faith in it is duly shaken, the people are ready to part with their relics. In this way the missionaries and their employers are supposed to make a great deal of money by buying at low and selling at high prices. The explanation is an ingenious one, and may possibly be a specimen of Japanese humor or Satsuma joke. — *N. Y. Tribune.*

Cologne Cathedral. — There is a stone on the eastern face of the south tower of Cologne Cathedral which has recently been decorated with a rich gilt border. It is at the height of the central ridge of the roof, and the very stone which was laid by King Frederick William IV, in 1842, as the foundation of the additional work on the towers, then just taken in hand, and but lately completed. From that point, in looking upward, one is able, it is said, to realize with some correctness the enormous height of the new work above the older elevations.

Monument to Jefferson. — Among the recommendations in the book of estimates submitted by the Secretary of the Treasury is an appropriation of $10,000 to erect a monument at the grave of Thomas Jefferson at Monticello, Va.

The Distribution of Asphalts. — Bituminous substances, apparently of organic origin, are found in various parts of the world. Sometimes they occur in a free state, as in the island of Trinidad, and at others impregnating calcareous rocks, or serving as a cement to hold the particles together, as at Val de Travers or Seyssel. For several reasons the asphalt lake in Trinidad possesses special interest for us. The island, which is the southernmost of the Lesser Antilles, lies off the northern coast of South America, and is easily accessible from any of our seaports. Here, amid the most luxuriant vegetation, is a lake three miles in circumference, on the surface of which lies a crust of asphaltum of such tenacity that in the rainy season a person can walk across it; but under the influence of the hot sun it softens to a thick tar. This crust receives accessions from beneath, and formerly it would overflow and run into the sea, more than two miles away. A similar substance, known as "Jew's pitch," is washed ashore in considerable quantities around the borders of the Dead Sea. In Texas, south of Shreveport, there is said to be a pitch lake containing large quantities of bitumen, but little is yet known about it. In southern California there are accumulations of asphalt on the coast at Santa Barbara, San Louis Obispo, etc., which resembles, when pure, that from Trinidad. It promises to supply the wants of the western coast, as Trinidad will that of the eastern part of this country. In Kentucky there is a considerable quantity of asphaltic mineral which may sometime be utilized for road-making. An interesting and valuable asphaltic mineral, known as Albertite, is found in New Brunswick, and a similar one, called Grahamite, occurs in West Virginia and other parts of the country. In the mountains west of Denver, in Colorado, is a vertical bed of hard and brittle asphalt, not unlike Grahamite, while Albertite is found in small quantities in Lorain County, O., and Casey County, Ky. Bitumen is likewise found in Cuba, and is brought into commerce under the name of *chapopote*, or Mexican asphalt. In Europe, asphalt occurs chiefly in limestone, which forms, when crushed and packed, an excellent pavement. The principal points at which it is found are the following: Val de Travers, in the Swiss canton of Neufchâtel, fourteen miles from Neufchâtel, and sixteen or seventeen miles by rail from the French borders; Seyssel, on the Rhône, in the French department of the Ain, about thirty-three miles from Geneva; Lobsann, a small town in northern Alsace; Vorwohle, in Braunschweig; and Limmer, near the city of Hanover. The Italian province of Caserta, in the neighborhood of Naples, supplies Rome with an asphalt much used for terraces and flat roofs. — *E. J. Hallock in Popular Science Monthly.*

The Bronze Image of Dai-Butzu near Yokohama, Japan. — The following will serve to give some idea of the size of this famous image: The bronze Dai-Butzu was cast in the year 1252 by Ono Goroyemon, with the sanction of Go Fukakusa-no-tenno, and in pursuance of the desire expressed by the Sei-i-Tai-sho-gum Minamto no Yoritomo, of the city of Kamakura. The image was originally protected by a temple founded in 730; but in 1495 an inundation from the sea took place, and the temple was completely swept away, leaving only the foundation-stones. Since that date, a period of 387 years, the image has been exposed to the elements, and it is feared it is in danger of perishing. There is now an attempt being made to collect sufficient to build another temple over it. The image is about 50 feet high, 98 feet in circumference at the base, face 8½ feet long, from ear to ear 18 feet, length of eyes 4 feet, and of eyebrows 4 feet 2 inches; length of ears 6 feet 6 inches; length of mouth 3 feet 2½ inches; circumference of thumb 3¼ feet, while the knee is 34 feet in diameter. It is cast in a sitting posture, with the feet under it, knees spread out, and hands joined in front. The eyes are nearly closed, giving a placid expression to the face. The head is covered with short woolly curls, and is slightly bent forward. It is cast hollow, and we were allowed to go inside, where there are several small altars upon which pilgrims place burning incense sticks. There are numerous names written on the inside by visitors. One of the priests takes photographs, so we climbed up on the image by a ladder, and poised ourselves in graceful positions on his hands and arms for our photos. Although the idol is worshipped by the natives, they seem to have no reverence for it, but allow foreigners to walk all over it, and do not expect them to show any respect. I have noticed this peculiarity before, in visiting temples. A thing which would be considered highly sacrilegious if done by a native is considered all right in a foreigner.—*Correspondence of the Cincinnati Commercial.*

Solar Cannon of the Palais Royal. — The little cannon of the Palais Royal, in Paris, which automatically notes the hour of noon, dates from a greater antiquity than is generally known. It thundered during the Commune, under the Empire, during the days of '48, under Louis Phillippe, under the Restoration, during the wars of the Grande Armée, during the guillotines of the Reign of Terror, on the day when Camille Desmoulins harangued the people, under Louis XVI, under Louis XV. In his charming "Journey from Paris to St. Cloud, by Land and by Sea," published in 1751, Néel makes his young tourist regulate his watch by it. The pillar on which it is fixed stands at the point where, in 1641, a year before his death, Cardinal Richelieu established a bound between the manors of St. Honoré and of the Archbishopric. — *L'Astromomie.*

Restoring Fountains Abbey. — It has been rumored from time to time that Lord Ripon intended to mark his conversion to the Roman faith by restoring at least a part of Fountains Abbey. Certainly, if there is to be a revival of monastic institutions in England, it would be most desirable, from an archæological point of view, that it should be the means of restoring some of the magnificent remains now scattered over the country. Lord Ripon is very rich, and has only one child, Lord de Grey. Fountains was part of the great estate bequeathed to his father in 1845 by a remote kinswoman, Mrs. Lawrence. In 1822, when the fall of five arches of the cloister threatened the destruction of the arcade, they were rebuilt, and the entire roof was shored up. Ten years later the tower was rebuilt, and in 1840 other important repairs were made. — *New York Tribune.*

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. NO. 364.

DECEMBER 16, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE complaints about the obstruction caused to travel in New York by the work of laying steam-pipes in the streets grow louder and more frequent; but as the Department of Public Works has forbidden any further disturbance of the pavements until spring opens, the citizens will have a respite from their troubles; unless, indeed, the packing of a valve should blow out, or some other accident should happen which would render it absolutely necessary to dig down to the pipes. So great is the inconvenience, in some cases, caused by these operations, that a popular demand has arisen that the companies should be compelled, on resuming their work, to confine their labors in the streets to the night, leaving them unobstructed during the day; but the franchises granted by the city government are so liberal that it would be impracticable to curtail them now by any such restriction. Mr. Hamlin, however, the Deputy Commissioner of Public Works, makes the suggestion that it might be within the power of the city authorities to insist upon the speedy completion of the work, and for that end to require that it should be prosecuted by night as well as by day. This would at least shorten the time during which the companies will hold possession of the streets, and so much the citizens, it would seem, might justly require. In view of the multifarious circumstances under which thoroughfares in towns are now obstructed or torn up altogether, it might perhaps be worth considering whether such a city as New York would not find it profitable to construct subways through at least the more important streets, with the idea of renting the use of them to such individuals or corporations as may be willing to pay for the privilege. If, for instance, a conduit were built under Broadway, Sixth Avenue, Fourteenth or Twenty-third Street, its value as a drain for surface-water would go far to pay the expense of constructing it, while sewage proper could be carried through it, with great advantage in all respects, in small, tight, but accessible pipes. Besides these public purposes, it would be available for conveying gas, steam and water pipes, and pneumatic tubes, such as are now employed for various uses; while telegraph, telephone and electric-light wires, which must before long be banished from the streets, would find the best possible accommodation in the same space. As the gas and steam-heating companies would save an immense sum, both in cost of laying pipes and in maintenance, by being allowed to carry their lines through an open and convenient passage-way, they could afford a high price for such accommodation, and the proprietors of electrical wires would be eager to share their privileges; while the public, by a judicious outlay, might thus in the end gain, not only a certain return on its investment, but a great further advantage in the abolition of overhead wires, and the substantial prevention of street excavations, with their consequent injury to pavements and discomforts of all kinds.

A REMARKABLE paper was read at a recent meeting of the Massachusetts State Board of Agriculture, by Professor C. S. Sargent, upon the importance of devising some means to prevent the forest fires which every year lay waste thousands of acres of land, covered with valuable timber, in every State of the Union. During the year 1880, according to the census returns, the loss of property by forest fires in Pennsylvania alone was more than three million dollars, and even in the small manufacturing State of Massachusetts it was over one hundred thousand dollars in the same time, while the actual destructive effects of such conflagrations, according to Professor Sargent, far from being confined to the mere waste of a given amount of salable timber, extend through a long series of years, during which the charred soil is slowly recovering its capacity for producing another growth of wood. The succession of crops upon land which has once been burned over is very interesting. In the case of a forest of white-pine, the most valuable timber that we have, many years elapse before any tree-growth whatever springs up on the scorched surface. The vegetation which first appears consists of low herbs, particularly the so-called "fire-weed," whose light seeds will germinate even in the poorest ground. As successive growths of this decay, and vegetable mould accumulates, blackberry vines and raspberries make their appearance, springing from seeds brought by birds, and later the birches and mountain cherry-trees, sheltered in their early stages by the shade of the vines and shrubs, obtain a foothold. These are short-lived trees, but they serve to protect the ground, and as they decay are succeeded by oaks and maples, which retain possession of the territory for an indefinite period. The annual fall of their leaves steadily enriches the soil, and after a certain number of years, usually from fifty to a hundred, after the original burning, it becomes fitted to produce again the original white-pine, for which, however, the land must be cleared with the axe and subjected to cultivation.

SUCH fires, then, not only consume the trees over which they pass, but destroy for generations the value of the soil itself, and more than this, the constant danger of them continually menaces all timber-land, and drives away capital from an investment which would otherwise be both safe and profitable. This, in the words of the paper, "is a matter of special interest to New England to-day, because upon it largely depends the country's future supply of white-pine, and the greatly enhanced value in the early future of much New England land." Already, in some portions of the Eastern States, the second growth of pine upon land no longer profitable for agriculture has become of great value, and in Massachusetts alone about one million dollars' worth of this wood was cut and sold in 1880 from land once used for tillage. According to Professor Sargent, the climate and soil of New England are better suited to the production of white-pine than those of any other portion of the country, and if the young trees, of which more are already growing in this than any other section, can be protected from fires, the annual yield will, he predicts, in a few years exceed in value the net profits upon all the other crops which its farms can produce. Such a prospect as this should be, and we doubt not will be, a very pleasant one for the owners of the exhausted farms which cover so large a portion of all the New England States, and if the millions of acres now given up to useless weeds and brush-wood can as easily as Professor Sargent thinks be transformed into nurseries for the cultivation of a timber which, it is not too much to say, commands a market more steady and certain than that of any other vegetable product, a great future is in store for the landed property of that portion of the country. The only important requisite, he says, for making such territory more valuable than the best agricultural land, is a provision for securing reasonable immunity from conflagrations, and this is a matter in which stringent laws can do much, and care still more, to promote the desired end. The principal cause of forest fires is, it seems, the fall of sparks from locomotives among the trees; next to this is the carelessness of hunters, or of charcoal or brush burners, while malicious incendiarism is of rare occurrence. As a remedy against the first danger, he advocates the compulsory use of spark-arresters on all locomotives, while the accidents which arise from the other causes can be very much diminished by systematic removal of brush-wood and fallen twigs, which soon become as dry as tinder, and spread a fire rapidly through the woods.

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The noble palace of the Tuileries, or rather, the piles of shattered stone which stand in its place, have been sold for thirty-three thousand francs, under the condition that the ground shall be cleared in six months. The ruin is already in a dangerous condition, and the great Salle des Maréchaux can only be entered with great risk, but everywhere can be seen the remains of the splendor which even the malice of the Commune could not entirely destroy. The original palace of the Tuileries was begun in 1564, from the designs of Philibert Delorme and Jean Bullant, as a residence for the Queen dowager, Catherine de Medici, and was then of comparatively small dimensions, comprising only the central part of the present range of buildings. The north and south wings, with the Pavillon de Flore, and the Pavillon de Marsan, which form the terminal points of the façade as it now exists, were added by Ducerceau, under Henry of Navarre, after the long wars of religion which followed the massacre of St. Bartholomew, but these were partially rebuilt and altered during the Second Empire. At present both the corner pavilions are in good repair, and are occupied by public offices, so that only the portion between them will be removed. This is chiefly remarkable for the beauty of its sculptured detail, which surpasses in delicate richness that of any other portion of the vast assemblage of buildings to which it is attached; the most famous portion of all being perhaps a range of columns, the lower part of whose shafts is covered with a network of interlacing vines. These are still standing, or were standing a few years ago, although badly broken; and it is to be hoped that some of them may be preserved for the benefit of art.

The project for a ship-canal across Cape Cod appears, if we may trust the correspondent of the St. Paul *Pioneer Press*, to have been revived in Boston. According to this journal, Mr. Nathan Appleton, a gentleman well known in Boston and in Paris, where he contracted an intimate friendship with M. de Lesseps, has filed a notice of an application to be made to the State Legislature of Massachusetts the present season for the incorporation of a company, with a capital stock of two million dollars, to complete the work which has been so many times attempted in vain. The account goes on to say that M. de Lesseps, as well as General Turr, the projector of the canal across the Isthmus of Corinth, will interest themselves in the new scheme. The real question in regard to the Cape Cod Canal seems to be, not whether it can be constructed, but whether the profits to be derived from it will ever pay interest on the outlay. The distance from the Monument River on one side of the Cape to the Scusset River on the other side is only about a mile, and the greatest elevation of the ground between them is a little over twenty-five feet; the soil is sandy, and it is thought that no rock excavation whatever will be needed. Under these circumstances, the cost of construction will be comparatively small, but the distance saved by passing through it instead of going around the Cape is so unimportant that coasting vessels will in fair weather hardly be willing to pay a heavy toll for the privilege.

Two more ship-canal schemes are in process of organization by private associations, one of which is for the construction of a passage between the Delaware and Chesapeake Bays, at a cost of some six million dollars, while the other contemplates the cutting of a canal across the peninsula of Florida, connecting the Gulf of Mexico with the Atlantic Ocean, at an expense of about five million dollars. Both of these enterprises, besides their obvious benefit to the ports of New Orleans and Baltimore, will be of advantage to the general coasting trade of the country, which now reaches very large proportions, and the Florida Canal may possibly derive some benefit from the freight traffic which will pass over the Tehuantepec ship-railway, if that should ever be constructed, as its projector, Captain Eads, thinks will certainly be the case.

The question of accepting the gift of the State of Massachusetts to the city of Boston, of land for a public library building has received attention in the municipal government, and two reports have been presented by the Committee charged with its consideration. The majority report favors the acceptance of the land, and the erection upon it of a building which will contain eleven hundred thousand volumes, at an estimated cost of six hundred and fifty thousand dollars. The minority report urges a different scheme, which is, in substance, after asking the consent of the State authorities to the change, to remodel the new High School building, just completed, so as to fit it for the reception of the library, and build a new High School on the lot presented by the State. The ground of this rather startling recommendation is that the new High School building is unnecessarily large, and that the present opportunity is a favorable one to get rid of it, by turning it over to the trustees of the library to adapt it to their purposes as best they can, while the School Board is making new experiments on the library land. The cost of remodelling the school building is estimated at about two hundred and fifty thousand dollars, and it is thought that a new school of a size better suited to the wants of the city, can be built for about the same sum. If there is really any economy in this remarkable scheme, it will probably be made evident in due time; for the present it would perhaps be indiscreet to comment upon it.

Shortly after the discovery of the remains of a Roman city near Poitiers, in France, explorations at Eining, in Bavaria, brought to light the ruins of another villa, or as some think, a "casino," or military club-house, attached to a permanent fortified camp. The town of Eining is situated very near the wall which was built by the Romans to resist the inroads of the Germanic tribes, and the camp at Eining was probably a part of the line of defences. The building is about one hundred by two hundred feet on plan, and is built of brick, the bricks being stamped with the names of the soldier-workmen who made and used them. These stamps fix the date of erection at the time of the reign of the Emperor Marcus Aurelius, about 170 A. D. The pavement and the hypocausta, or underground flues for heating, are in good condition, and a large quantity of thick window-glass has been found, together with many small objects, such as cups and cooking utensils, bracelets, rings, knives, scissors, keys, bells, and so on. The excavations are now discontinued for want of funds to carry them on, but contributions have been asked for, and will doubtless be readily obtained. After reading about these interesting discoveries in Europe, it is gratifying to learn that the American expedition at Assos has met with unexpected success in its labors for the past season, although particulars are reserved for the regular report of the Archæological Institute. The announcement is made that the Turkish government has decided to permit no more excavation or archæological investigation of any kind within its territory, so that the concession enjoyed by the Assos expedition is the last that will be granted, and as the labors of Dr. Humann at Pergamon have ceased, it is, with the exception, perhaps, of that held by Dr. Schliemann, the only one now in force.

A rather comic trial is going on in London, in which a sculptor, very prominent in the newspapers and general conversation, but not particularly popular among his artistic brethren, brings suit for libel against the proprietor of a newspaper which some time ago asserted that he was not really the author of the works attributed to him, but that he employed some one more skilful than himself to design and execute the statues for which he obtained the credit and remuneration. This charge is so frequently brought against sculptors that Mr. Belt was perhaps right in thinking it at first unworthy of notice, but it was reiterated so persistently as finally to threaten the entire ruin of his reputation and business, and in self-defence an action at law was brought. The evidence brought forward in the earlier portion of the trial seemed decidedly favorable to the plaintiff; many persons testified to having seen him shaping and altering his clay models, under circumstances which made deception impossible, and the assistance which he would need in roughly cutting the marble to the lines of the model was evidently legitimate enough. The opposing party, however, produced a witness, a Belgian named Verhyden, who professed to be employed by Mr. Belt, not only to do the more laborious part of the work of carrying out the master's design, but also to sketch out and model the design itself in many cases, and a diary which he kept showed the payments which he had received for such services. The most suspicious circumstance about the connection of the two sculptors seems to have been that Verhyden came to Mr. Belt's studio mostly at night, and that even then a trap-door was arranged by which he could escape unobserved in case visitors were announced; as if Mr. Belt, at least, desired to conceal the extent of his indebtedness to the skill of his assistant. What will be the result of the trial, no one can guess.

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WATER-CLOSETS.[1]

WATER-CLOSETS as conveniences are so necessary, and in their proper construction are so important to our comfort and health, that we think any research into their history will repay us by increasing our knowledge on the subject.

It will be necessary in this paper to review, cursorily, other modes of convenience in countries where, and at times when, water-closets properly speaking were not in use.

Naturally, we first examine the ruins of Egypt, where existed the earliest traces of civilization, for remains of water-closets. The small private and detached rooms which we find in the remains of Egyptian houses were probably used as privies. Ewbank, in his work on hydraulics, calls the summer chamber[2] of Eglon, king of Moab, a water-closet.

If we thought proper to follow the example of Ewbank we would call water-closets the private rooms which were in an isolated position in one of the halls, being near a door communicating with the other chambers. Sir J. Gardner Wilkinson says: "These rooms bear a striking resemblance to the before-mentioned private room of Eglon."[3]

That the Greeks[4] made use of privies in their houses is proved by an old writer[5] from a passage in Aristophanes (Ecclesiaz., verse 1050). This was about four hundred years before Christ.

The Romans, if not the first in art, the leaders in all that pertained to luxury and comfort, were the first, as far as we can ascertain, to use water-closets. In Rome we find four kinds of receptacles for excreta. Close stools (*lasana*), in which the rich ancients sometimes used gold or silver bowls; vases (*gastra*) which were stationed on the roadways; public privies (*cloacina*), of which Sir William Gell tells us there were one hundred and forty-four in Rome; privies (*latrina*), probably for private use.

From their derivation we would infer the two classes last mentioned to be water-closets, *cloacina* being derived from *cloaca*, a sewer or drain, and *latrina* being a diminutive of *lavatrina*, a wash-bowl or basin. No doubt, as at the present day, the name included the room as well as the basin or receptacle contained in the room. Pompeii was covered with ashes and lava by an eruption of Mount Vesuvius more than eighteen hundred years ago, and among its ruins were found the most perfect remains of an ancient water-closet. Pompeii being a small town and a province of Rome, we would suppose the water-closets to have been more numerous and more elaborately ornamented in the capital city.

In the *Pompeiana* Sir William Gell,[6] describing a privy, writes of an arched recess about three feet deep discovered in the kitchen of one of the ruined dwellings of Pompeii, most inconveniently placed, according to American ideas (Fig. 1). The wood-work was gone when discovered, about 1819, but the marks of the hinges and fastenings were still visible. Three or four feet to one side were the remains of brick ovens. It would appear, according to a quotation from Pretonius, that in ancient Italy it was considered desirable to have in close proximity the place for the preparation of the food and the receptacle for the excreta. The privies in or adjoining the kitchen were probably for the women, while others which have been discovered at the back of the house were for the men. These chambers were sometimes finished beautifully, having tesselated pavements, and in some instances windows looking into small interior courts, an example which the moderns seem injudiciously prone to follow.

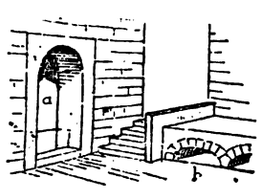

Fig. 1.
Privy in kitchen in Pompeii.
a, Niche. *b*, Ovens.

Fosbroke says, under the head of ancient water-closets,[7] "That of the Palace of the Cæsars is adorned with marble and mosaick. At the back of one is a cistern, the water of which is distributed by cocks to the different seats. The pipe and bason of one still remains at Pompeii and is like ours." (1825 A. D.)

In a paper read before the Society of Antiquaries in 1775, relating to discoveries in Pompeii, Sir William Hamilton[8] says: "Close to the Temple of Isis is a theatre, no more of which has been cleared than the scene and corridor which leads to the seats. In the corridor was a retiring-place for necessary occasions, where the pipe to convey the water, and the bason like that of our water-closets (1775) still remain, the wood of the seat only having mouldered away by time."

The above-mentioned remains, seen by Sir William Hamilton, conclusively prove the existence of water-closets more than eighteen hundred years ago, with basin, water-supply and waste for the water, and excreta must necessarily have been carried off by a drain of some kind.

In all descriptions of ancient baths we find a latrina, that near the entrance of the ruins of the one in Pompeii, mentioned and shown in the illustration, but it is in no case fully described.[9]

According to Olympiodorous there were in the Thermæ of Antoninus (about 200 A. D.) sixteen hundred seats of marble with holes like a close stool for the convenience of those who attended either the baths or the gymnasium.

Vitruvius, strange to say, does not mention water-closets or privies in his description of private houses. Both ancient and modern writers seem to avoid the subject. Ewbank states that a number of water-closets were erected near the mosques and temples in Old Rome, Smyrna, Constantinople, and probably all ancient cities. He does not give his authorities for the statement, and it would appear as if it were a little overdrawn.[10] With the decline of the Roman empire, water-closets, following her other luxuries and comforts, seem to have gone out of date.

Giving a cursory review of the privies used in the middle ages we leave unaccounted for nearly a thousand years, during which time there seem to have been no privies used inside houses. The castle of Rochester, designed in part by Bishop Gundulph about 1088, has outlets for privies and sinks similar to the outlets for smoke, in the first instance going downward, instead of upward as in the case of their chimneys.

In a paper read by Edward King[11] before the Society of Antiquaries (1782 A. D.) in relation to a Saxon castle, he says: "In one of the corners is a narrow passage to a small closet in the wall, which served for a privy, having the usual kind of an outlet through a loop." (Fig. 2.) Diagonally across from the privy is a similar passage and closet supposed to have been a well. This tower or castle was undoubtedly Saxon, having been given by William the Conqueror to William de Peverel and called the Castle on the Peake. We learn from Viollet-le-Duc[12] that castles (*châteaux*) at the commencement of the thirteenth century had privies (*latrines*) on each floor, constructed so as to avoid the inconveniences attached to these necessities. They were generally found projecting on corbels, from an angle formed by a buttress and the main wall (Figs. 3 and 4) so the fæcal matter might be cast well out and down the precipice into the woods which usually surrounded these buildings.

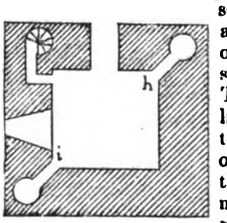

Fig. 2.
Plan of Castle on the Peake.
h, Privy. *i*, Well.

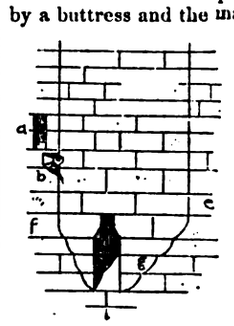

Fig. 3. — Elevation.
Fig. 4. — Plan.
Thirteenth-Century Privy.
a, Window. *b*, Urinal. *c*, Seat. *f*, Wall. *e*, Buttress. *d*, Door. *g*, Corbels.

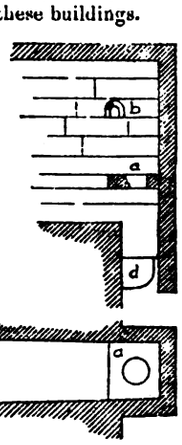

Fig. 5. — Section.
Fig. 6. — Plan.
Landsberg Latrine.
a, Seat. *b*, Window. *c*, Hanging T-shaped stone *d*, Corbels. *e*, Door.

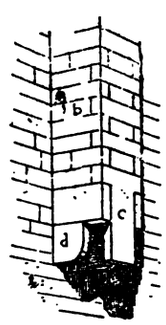

Fig. 7. — Perspective Sketch.

He describes one which is corbelled from the wall and buttress in the usual way. The seat is concealed and protected from missiles by the corbels, and it communicates with the halls and stairways by a door. In the same closet there is a urinal with drain, and a drip on the outside, and also a window opening into the outer air. In the castle of Landsberg on the Lower Rhine, which dates from the twelfth century, there is one (Figs. 5, 6, and 7), that differs from the above. The seat is guarded by a rectangular projection from the wall which is supported on corbels. The seat is protected from arrows and other projectiles by a stone shaped like a T, which hangs on and below the corbels. In garrisoned castles they always had projections reserved for privies, and they were separated from the main building by small passage-ways. There are privies of this kind in the castle of Chauvigny, while the castle of Northumberland, England, has them, almost monumental in charac-

[1] A paper by Mr. Glenn Brown, architect, read at the Sixteenth Annual Convention of the American Institute of Architects, held at Cincinnati, October 26-27, 1882.

[2] *Judges*, III, 20-25.

[3] *Egypt*, Sir J. Gardner Wilkinson, Vol. II, page 104.

[4] Viollet-le-Duc has given the Egyptians', Greeks' and Romans' privies (*latrines*) in their houses in the *Habitations of Man*, pages 92-102, 197 and 231.

[5] *Hiem de l' Academy des Sciences Inscriptions nouvellement établie à Troyes èn Champagne*. A. Troyeset, Paris. 1756.

[6] *Pompeiana*, Sir William Gell, Vol. II, page 171; illustration, page 151.

[7] *Encyclopedia of Antiquities*, Rev. Thomas Dudley Fosbroke. Page 348. 1825.

[8] *Archæologia*, Vol. IV, page 168. 1777.

[9] *Encyclopedia Britannica*, Vol. III, page 435.

[10] *Hydraulics*, Thomas Ewbank, pages 261, 562. New edition, 1876.

[11] *Archæologia*, Vol VI, page 242.

[12] *Dictionnaire d' Architecture*, XIIth au XVIth siècle, Vol. VI, pages 163-170.

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ter or design. The castle of Marcousis has an extension devoted to latrines, a set of four for each story (Figs. 8 and 9). There is a passage-way extending from the main building with solid stone balustrade to prevent people from falling. There is a chute or drain from each seat leading to a double-arched cesspool. This part of the building is ventilated by a large window above the highest tier of latrines. The castle of Pierrefonds was constructed in the fourteenth century. It has a set of latrines arranged for each story in a semi-circular projection (Figs. 10, 11 and 12). The cesspool, as we will call the place for the receptacle of the excreta, has a door for cleaning out the filth, and a window for ventilation. In the centre

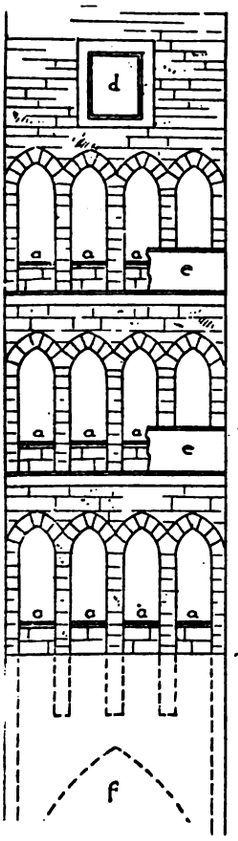

Fig. 8. — Elevation.

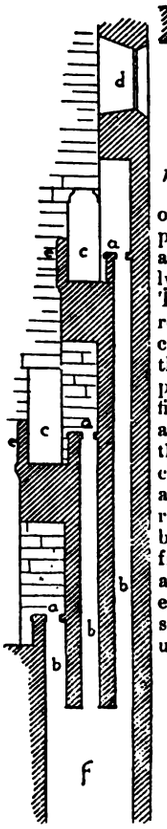

Fig. 9. — Section.

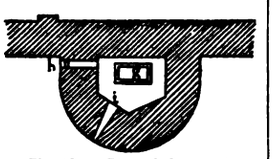

Fig. 10. — Plan of Cesspool.
h, Door. *i*, Window. *g*, Stone.

of this chamber is a large piece of cut stone on which a man can stand conveniently while cleaning out the pit. The chute or drain leads directly from the seats to the cesspool, and is carried through the roof for the purpose of ventilation; the first instance, probably, of a soil-pipe being carried through the roof. These closets, and it was nearly always the case at this period, as we have mentioned before, were separated from the main building by a short hall with a door at each end. This idea, in some instances, has been utilized in modern times.

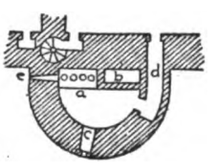

Fig. 11. — Plan of Principal Story.

Latrines, Marcousis Castle.

a, Seat. *b*, Chute or Drain. *c*, Entrance from Main Building. *d*, Window. *f*, Cesspool. *e*, Balustrade.

a, Seats. *b*, Chute or Drain. *e*, Vent. *c*, Window. *d*, Small Entrance-hall.

These closets also have windows and vents in each story.

Sometimes latrines were directly adjoining dungeons with drain running to the cesspool (Fig. 13).

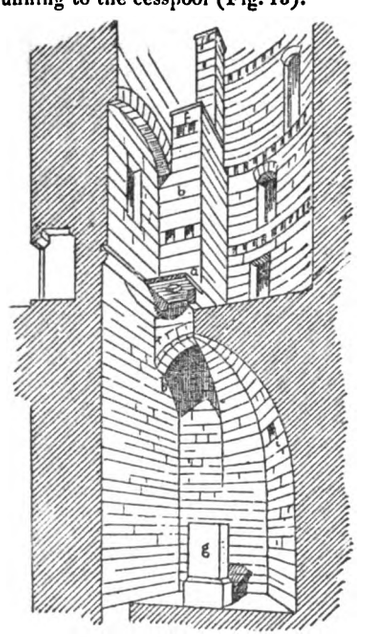

Fig. 12. — Perspective Sketch.

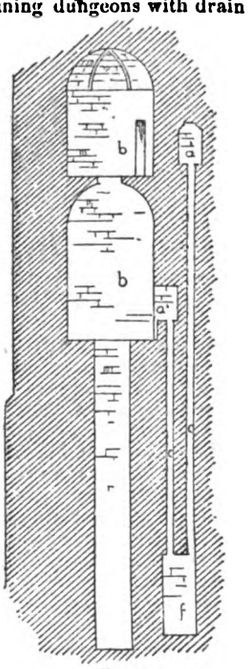

Fig. 13.

a, Latrine. *b*, Dungeon. *c*, Chute or Drain. *f*, Cesspool.

Sight-seers are frequently shown through these latrines, and are informed that the cesspools are dungeons, the agonies which have been endured by prisoners in their depths being graphically depicted by the guides.

Curiously enough the first mention we have of a water-closet, properly speaking, after the ones used by the Romans, is connected with the publication of a poem by Sir John Harrington on the "Metamorphosis of Ajax" (a close stool or commode), published in 1596. This poem was occasioned, as Henry Harrington reports, by the author having invented a kind of water-closet for his house at Kelson.[1]

In the East water-closets, or what may be called water-closets, seem to have been used at an early date.

Ogilby, in a description of the city of Fez, says: "The river Fez subdivides into many clear-running channels through the streets, serving not only each private house, but churches, inns, hospitals, and other public places, to their great convenience. Round about the mosques are one hundred and fifty common places of ease, built four-square and divided into single stool-rooms, each furnished with a cock and marble cistern, which scoureth and keepeth all neat and clean, as if these places were intended for some sweeter employment."[2]

Tavernier, in his "Relations to the Seraglio," says: "The places for the easing of nature are on the right hand divided into four little rooms, which are always kept very clean, and paved with square pieces of white marble. The Turks do not sit down as we do when we are in those places, but they squat down over the holes, which is not half a foot, or a little more, above the ground. The hole is covered with an iron plate, which rises and falls by a spring, and turning one way or the other, at the falling of the least weight upon it, resumes the station it was in before as soon as the ordure has fallen from it. I have observed that the Turks and generally all the Mohammedans do not use paper in such cases, or upon any indecent occasion, and when they go to those kind of places they carry along with them a pot of water, to wash themselves withal, and the iron plate is also made clean at the same time, and so the hole being always covered, and the iron plate always kept clean, there can be no ill smell in the place, and that the rather for the small current of water that passes under that place carries away all the ordure."

. . . "A little gallery which lies to the left hand of the bath, leads to places designed for the easing of nature, and every seat has a little cock which supplies them with water to wash themselves after they are done."

Baldwin Latham, quoting from Ewbank, would lead us to suppose the above-mentioned cocks were primarily for the purpose of washing the bowl of the closet, if there was one, while it was for the purpose of washing the person using the closet.

We see no mention of water-closets in Europe again until 1770. During the intervening period, while art had professedly entered into a new life, the useful arts seem to have been ignored.

In England a close stool or commode, called an ajax, or jakes, was generally used. According to Viollet-le-Duc and other writers, cleanliness, the first principle of sanitation, was thought of very little importance during this period.

Privies were used in Germany before they were in France. In Paris people were allowed to throw their excreta from the windows into the street, provided they gave the verbal warning, "*Gare l' eau*" three times. In Edinburgh the same custom prevailed; parties walking the streets had necessarily to cry "Haud your han," for fear of what might befall them.

The above practice was forbidden in Paris in 1395, but seems to have continued in Edinburgh until 1750. It was during this period also, that men walked the streets of Edinburgh carrying pails or buckets for the public convenience, and wearing a cloak large enough to envelope their customers and apparatus, crying "Wha wants me for a bawbee."

The Parisian code of laws improved in 1513 expressly ordered that every house should have a privy, but as late as 1700 A. D. the police were instructed to close all houses whose occupants did not provide one within a month.

During the reign of Louis XIV of France the courtiers found it necessary to ease themselves in the halls of the palace of Versailles because there were neither privies nor water-closets. Viollet-le-Duc tells us that close stools were used in the palace of Versailles in the eighteenth century. He also writes of an old lady belonging to the court of Louis the XV of France, who passed through the halls of St. Cloud with him when a young man. The odor of an offensive vessel caused her to exclaim with pleasure, "This smell recalls the good old times." Some of our modern closets would have delighted the old lady.

Privies were not used in Spain until about 1770, and have not been used in Warsaw more than fifty years. As late as 1846 we find in Berlin "small closets located on the landings of the stairs, which require to be emptied every other night, to the no great satisfaction of the olfactory nerves."

Aubrey, writing in 1718, describes a water-closet which he had seen. He says: "Here (at Sir Francis Carew's, Beddington, Sur-

[1] *Nuæ Antiquæ*, page xl. 1804 New edition.
[2] Ogilby's *Africa*, page 188. 1670.
[3] *Inventions*, John Beckman, pages 269-282. 1846.

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rey) I saw a pretty machine to cleanse an 'house of office,' viz.: by a small stream of water, no bigger than one's finger, which ran into an engine made like a bit of a fire-shovel, which hung upon its centre of gravity, so that when it was full a considerable body of water fell down with some force and washed away the filth."

This must have been very much like the closet seen in the city of Fez by Ogilby.

THE EXPLORATIONS AT ASSOS. — I.

THE adventurous trip of the little sail-boat *Dorian* in 1879 will be fresh in the recollection of such at least of our readers as were interested in its object — a survey of the remains of Greek architecture, and especially of Doric, which exist on the borders of the Ægean Sea. It was on this trip that Mr. Clarke selected Assos as a point where a thorough investigation was likely to be especially fruitful. His strong recommendation determined the Archæological Institute of America to send out under his direction an expedition which should explore as completely as possible the site of Assos. Mr. Clarke's Notes on Greek Shores, printed in the first annual report of the Institute (for 1880) as a record of the *Dorian's* cruise, gave his first observations at Assos; the report lately published,[1] gives a detailed account of the first year's work of his expedition. Of this work Mr. Clarke had given a brief sketch, dwelling mostly on the great temple, in a paper which was read a year ago before the convention of the American Institute of Architects, and printed in the *American Architect* (December 11, 1881).

A very old Lesbian colony, Assos had become by the sixth century B. C. the most important city of the Troad. It prospered through the Lydian and Persian monarchies, and the Roman dominion, until the early Christian centuries, after which it fell apparently into insignificance and was perhaps dismantled, but served for a military stronghold under Genoese adventurers in the fourteenth century, and later under the Turks, without recovering its commercial importance; for, excepting its few early Byzantine buildings, the remnants of mediæval walls and Turkish fortifications, and its decrepit modern Turkish village, it shows no remains of later than classical date. This history and the fact that its chief building material, being volcanic stone, was no temptation to the greatest ravager of architectural remains in Turkish countries — the lime-burner — have left Assos, till a comparatively recent time, full of interesting memorials, though because of its isolation and its remoteness from the lines of main interest in Greek history, it has not hitherto attracted any zealous exploration. But, first and last, a good many travellers have called attention to the promise which it offered. Colonel Leake noted this promise as long ago as 1800, and later called attention to it in his published journal, from which Mr. Clarke quotes the judgment that the remains of Assos give the best picture that now exists (or then existed) of a Greek town. Since Colonel Leake, a number of travellers, English, French, German, have noticed the ruins; but our chief knowledge of them has come from the plates and description of Texier, in the voluminous report published by the French Government, of his too extended explorations of Asia Minor. But Texier's examination, though recorded with every appearance of precision, was hasty, and the accounts of subsequent travellers have thrown doubt on his report. Mr. Clarke, indeed, who now and again overhauls him with considerable asperity, roundly ascribes to him *le génie de l'inexactitude*. Unfortunately the Mahommedan depredations, which between Leake's time (1800) and Texier's (1835) had added materially to the injuries of earlier generations, have been carried on energetically down to our own days. So late as in 1864 the Turkish Government sent a detachment of soldiers to Assos, to quarry from its ruins material for some large works that were going on at Constantinople, and though the demolition seems to have been suddenly interrupted, it seems also to have been systematic and considerable. But enough remains to mark nearly the whole line of the original enclosure, and give us, says Mr. Clarke, our best opportunity to study Greek fortifications. Besides this, the remains of the temple, so singularly restored by Texier, called for farther examination, and there were many ruins of public buildings scattered up and down the slopes of the hill on which the city was perched.

This hill, the explorers tell us, is volcanic, and rises abruptly seven hundred and fifty feet above the northern shore of the Gulf of Adramytium, looking southward to the island of Lesbos, half a dozen miles off. The acropolis, girt by a double circuit of walls, is set in the very crater, and from it we can see down into the holds of the little vessels inside the modern mole which apes the old one. Around the hill and up its steep slopes the city was built, enclosed in an irregular lower circuit of wall about two miles long. The only building now to be traced on the summit of the acropolis is the famous temple. A mass of ruins as yet mostly undeciphered, and the miserable Turkish village of Behram, occupy the rest of the enclosure. The explorers, after making a survey of the whole site which they have recorded in a handsome map, began their work with the temple, following with the other buildings, which the first season's work did not exhaust, and leaving the fortifications for the later examinations, which are still going on.

Of all the interesting things that have hitherto been discovered at Assos, none have attracted so much attention and so much discussion as the remarkable series of bas-reliefs which Texier illustrated in his report, and which, brought to Paris by M. Raoul Rochette, are now in the sculpture gallery of the Louvre. They figure in the histories of art as among the most archaic examples of Greek sculpture, and are assigned by pretty unanimous consent of archæologists to a period not later than the sixth century B. C. They have served, moreover, as a striking illustration of the interpenetration of Greek and Oriental art, being very Asiatic in treatment and partly in subject, while they seem to embody myths of purely Greek origin. All this is no more, indeed, than might well have been effected in a colony of Greek race whose greatest prosperity was under the dominion of the Lydian monarchy. But what was, at least to an architect, the most striking peculiarity of these sculptures was their position in the temple itself, if we were to believe Texier's story. He had confidently assigned them to the architrave of the Doric order of the temple, and they are so shown in his restoration. This paradoxical restoration, absolutely unlike anything known in Doric architecture, was so little welcomed by the learned that Texier asked the French Academy to make a formal examination of the grounds for it. Accordingly the whole architectural section of the Academy was appointed a committee to look into the question. But this committee never reported, and Texier interpreted their silence to mean that they could not impugn his restoration, for which his arguments were: that the carved blocks, where he found them whole, were just long enough to cover an intercolumniation, and half as thick as a column; that they bear the *regulæ*, or, as he considered it, the uncut guttæ-band of the triglyph; and that these regulæ are just the width of a metope apart. It should be said, also, that there are among Texier's blocks two or three of the metopes themselves, sculptured in the same style as the long stones which he assigns to the architrave.

Among the important discoveries of the American Expedition are several blocks which are manifestly of the same series with those that are preserved in the Louvre, and it is curious to note that one of the blocks found completes the fragment in the Louvre which bears a recumbent sphynx. The two parts, when their irregular fracture is fitted together, make a symmetrical composition of two sphynxes facing each other, each with one fore-paw raised to the top of a short pillar that stands between them—a composition which reminds one of the sculpture over the lion's gate at Mycenæ. It is again curious that the Americans have discovered the greater part of a second composition, the exact counterpart of the first. In this second case the whole of one sphynx is recovered, the column, and the head and raised paw of the opposing sphynx, so that the repetition is unquestionable. It may be noted also that in one of the metopes in the Louvre is an analogous composition of two sitting sphynxes, but with nothing between them. Several other blocks of this series were found, the most important of which, a broken stone long enough to answer to a whole intercolumniation, contains a combat between a bowman and some centaurs. German archæologists are pretty well agreed in considering the relief in the Louvre of an archer struggling with a sea monster, to represent the combat of Hercules with Triton, and Mr. Clarke, with equal probability, assumes his archer to be Hercules interrupted by centaurs in his feasting with their brother centaur, Pholus. Several other stones were found, both from the architrave and the metopes, carved with groups of men or animals,—among the latter one which calls out Mr. Clarke's admiration for artistic cleverness, and repeats the motive common among those first found, a lion attacking an inferior animal, in this case a boar. Our readers will find the Louvre sculptures illustrated in the number of the *American Architect* referred to above, which contains Mr. Clarke's paper. We give in this number reductions of Mr. Bacon's admirable drawings from the new ones. We notice, by the way, that Plate 20 of the report is entitled "Fragments of a Temple Metope," but is described in the text as part of the relief of the architrave, or, as Mr. Clarke prefers to call it, the epistyle.

According to Mr. Clarke's description, and Mr. Bacon's drawings, which have every mark of fidelity, the sculptures vary considerably in execution, and some are more primitive than others, as if by inferior workmen, as indeed is seen in almost any accumulation of sculpture over a large surface. But they are all strikingly archaic, and in their arrangement very suggestive at once of Assyrian sculpture, and of the figured zones of the oldest Greek vases, which are believed to owe their ornament to Oriental influence; what German archæologists call *Asiatisirende Vasen*, for instance, and the so-called Tyrrhenian Amphoræ. Mr. Clarke, induced by certain peculiarities of the temple's plan, ascribes the building to the second quarter of the fifth century, a time when Phidias was already learning, if not practising, his art, and gives it even date with the The-

[1] Papers of the Archæological Institute of America, Classical Series. — I. Report on the Investigations at Assos, 1881. By Joseph Thacher Clarke. With an Appendix containing Inscriptions from Assos and Lesbos, and Papers by W. C. Lawton and J. S. Diller. Printed at the Cost of the Harvard Art Club and the Harvard Philological Society. Boston: A. Williams & Co. London: N. Trübner & Co., 1882.

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seum at Athens. But the naïvely pronounced archaism of the sculpture, as well as of the architectural detail, is certainly a stumbling-block in the way of his theory.

There are plenty of examples to show us that archaic characteristics lingered, and were deliberately affected in works of art that were applied to religious uses or to those which were sanctioned by long tradition, after the actual progress of the art had left them behind. This was the case both in sculpture and painting, and is notably instanced by what are called the Panathenaic Amphoræ, whose affected archaism is discountenanced in the dates plainly indicated by their inscriptions. It is a recognized fact, too, that provincial art in all places and times lags behind metropolitan art in its developments. Allowing, nevertheless, for all this, it seems to us that the discrepancy between these sculptures and Mr. Clarke's date is greater than can be accounted for by both these influences combined. The low relief of the figures, the primitive form of most of the centaurs, which have human fore-legs, the profiled faces with eyes shown as in front view, the lean and naïvely designed figures, the superiority in general of the animal sculpture to the human, are all irresistibly archaic in their effect. From the fact that some of the centaurs have horses' fore-legs the work would seem to have covered a time of transition from extreme to modified archaism, whenever that transition may have occurred at Assos, and indeed was itself possibly the occasion of the transition. Mr. Clarke's opinion is entitled to the respect due to his knowledge, but appearances do not seem to favor it, and he very candidly acknowledges that German scholars who have examined his discoveries do not agree in it.

Mr. Clarke follows Semper's theory of the relation of these reliefs to the so-called empaistic work of the Phenician, Etrurian, and other ancient workmen, — that is, metal-work beaten up from sheets over a form, of which we lately have seen abundant examples in the findings of Dr. Schliemann at Mycenæ. He thinks we may trace in the sculptured architrave of Assos a survival of the primitive habit, familiar to readers of the Bible, as well as to archæologists, of overlaying the beams of temples and palaces with metal. As to the position of the reliefs, one theory suggests itself which seems to have been passed by, perhaps for good reasons, perhaps by default, but which would not have suggested itself until Mr. Clarke's examination had made clear the peculiarity of the plan of the temple. He shows that the front of the cella, with its columns *in antis*, is in line with the third column on the flank. Mr. Clarke thinks this peculiarity, — a rather unusual one, found also in the Theseum, — proves conclusively that the main architrave crossed the front of the cella and the side porticoes in one straight line, so marking off in the ceiling a vestibule which occupied the whole front of the temple. This is at least probable, but in the Theseum, the only temple in which such a disposition of the roof remains, this vestibule is set apart for special decoration; a continuous sculptured frieze runs across the front of the cella, answering to the Panathenaic frieze which surrounds the cella of the Parthenon, and to the Phigalian frieze (at Bassæ) which encircles the inner court or *hypæthrum*. Mr. Clarke, finding that there remained of the sculptured architrave at Assos a good deal too much for one front of the temple, and deciding against the idea that the flanks of the temple were sculptured, assumes that the sculpture was on both ends of the building, and naturally places the two similar groups of sphynxes over the central intercolumniations of the two ends. But it is the peculiarity of the temple at Assos that it has neither *posticum* nor entrance at the back, a peculiarity very rare among peripteral temples, and only shared by the little temple at Cadacchio, early in style, and of less than half the dimensions of that at Assos, and the three most archaic temples at Selinus, those called C, D and S. The rear of the temple was then essentially a back elevation and, we may suppose, less important than the front and the sides. There was no entrance to be marked by the two sphynxes, and it is difficult to see why this elevation should have been distinguished by sculpture. But there is a possibility, unless there is something to disprove it, that the vestibule which Mr. Clarke finds in front of the cella was itself surrounded by the carved architrave, or that the sculpture on the outer front was echoed on the face of the cella in a band analogous to that of the Theseum. Mr. Clarke is sure that none of the blocks which he has found were upon the cella wall. He is convinced that these stones were the exterior architrave by the dowel-holes which he found beneath the ends of the blocks, as if to dowel them to the abaci of the columns. He does not say whether these holes were found in all the blocks whose ends were to be seen, or whether they were in the unsculptured architraves as well. The blocks in the Louvre, as he says, have unfortunately been sawn down to thin slabs that they might be inserted in the wall; so that in them the indication is lost. In all other Doric temples, so far as we know, the triglyphs, regulæ and all, are omitted on the inside of the order of the peristyle. In the Theseum, for instance, the architrave and frieze are both unbroken, and the sculpture on the front of the cella is a continuous composition. The existence of the regulæ on the slabs would therefore suggest that they must have been on the outside; but we find that his internal section shows the regulæ, though not the triglyphs, on the inside, from which we infer that he did not find any architrave blocks without the regulæ. The fuller account of the temple to be published later may contain data which will be decisive of these questions. The report does not give room for all the reasons that may have determined the restoration, but without them the questions naturally suggest themselves: if there were regulæ on the inside of the main entablature, why not triglyphs? why not, also, sculpture? perhaps, even, on the metopes? This would be altogether an anomaly, but no greater than the anomaly of the carved architrave which we have to acknowledge. This, however, is mere conjecture; the actual description of the temple we must reserve for a second article.

REPORT OF THE NEW YORK CHAPTER, A. I. A.

New York, October 21, 1882.

To the American Institute of Architects:—

The routine business of the New York Chapter for the year 1881–82 has again been carried on by the Executive Committee, while its duties under the Building Law, in concert with the city authorities, in the matter of unsafe buildings, and in the exercise of discretionary power as regards new structures have, as usual, been fulfilled by its Committee on Examinations.

A draught of amendments to its By-Laws has lately been issued to its members in conjunction with the following letter:

New York, September 28, 1882.

Dear Sir, — I am entrusted by the Executive Committee to submit to you the amendments to the By-Laws proposed in the accompanying printed draught.

The experience of the New York Chapter (more or less parallel, it would appear, with that of all the other Chapters connected with the Institute) seems conclusive on the following points:

1. That while it was natural and commendable that in the inception of the Chapter, a high standard should have been assumed for its functions and responsibilities, its work was, nevertheless, begun on too ambitious a scale in relation to its means, as shown, *e. g.*, in the superfluity and too cumbrous organization of its Standing Committees, and in the heavy rental for a long time incurred without corresponding results, on the theory that ample room and appliances would be needed for its various schemes of education, collective display of members' work, etc.

2. That it is extremely difficult to get members away from the routine of engagements prescribed by their individual interests, as often as twice a month during eight months of the year.

The remedy for the existing defects in our autonomy would appear to lie in limiting ourselves — at least temporarily, and until our resources, by some good fortune, perhaps, increase—to a narrower field but surer aims, to fewer engagements, and to that concentration of responsibility, and minimum of working *personnel* which will tend to remove at once the cause of and excuse for neglect of associative duties.

By combination with the Secretary's personal appliances, the Executive Committee has reduced the rental to about a third of its figure some years ago, at 225 Broadway; while the charges for clerical service connected with the duties of the Secretary and Treasurer have been put at a merely nominal figure. This enables the Committee to follow the example of the Institute, and—as will be seen in the accompanying draught—to risk the experiment, even though the roll of Chapter names is so meagre, of a conditional reduction of dues.

Early notice will be given of a meeting for the consideration of the amendments herewith submitted as ameliorative of a condition of things which it is desirable should be improved; though the mere existence of the various branches of the Institute, with legal title, local habitation, official representatives, and accepted rules of professional procedure, is a patent and important fact, which largely controls the estimate and the dealings of the public and the courts, as regards architecture and its practitioners in this community. Yours respectfully,

(Signed) A. J. Bloor, Sec'y.

At a meeting of the Chapter held on the eighteenth inst., the By-Laws thus amended were adopted with modifications of the article on finance, embracing with some minor points, a reduction of the annual dues of practising members to $20, and of the initiative fee for juniors to $2, while an annual assessment of $1 is to be levied on the latter. The Secretary of the Chapter, for the information of the sister Chapters, had previously forwarded to the Secretary of each a copy of the draught and accompanying letter, and this will be followed by the By-Laws as adopted, after they shall be received from the printer.

The roll of the Chapter has been increased by the accession of four Practising Members, Messrs. H. G. Knapp, J. M. Slade, Douglas Smyth (the last advanced from junior membership), and Stanford White; while the grade of junior membership has lost by death one member, Mr. E. M. Kemp, a young man of amiable qualities, and of great professional promise, and considerable achievement under several full members of the Institute.

Respectfully submitted, A. J. Bloor, Sec'y.

REPORT OF THE PHILADELPHIA CHAPTER, A. I. A.

Philadelphia, October 23, 1882.

To the American Institute of Architects:—

The Philadelphia Chapter respectfully submits the following report for the year 1881–1882.

Meetings have been regularly called and fairly attended, and many have been made interesting and beneficial to our members, owing to the plan adopted of each and every professional member bringing drawings for general discussion. We have had an addition of three professional members to our roll.

The Chapter exerted its influence and had changed for the better our "Building Statutes" relating to bay and oriel windows, and this, we think, shows what can be done by united action, though it be of a few. Some of our City Fathers, having been much annoyed by applications from their constituents asking the privilege of erecting bay-windows, decided on a radical measure to protect themselves from further vexation; so some months back an ordinance, a copy of which we enclose, was sent to Councils. . . .

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CHAPEL FOR THE SISTERS
OF S. MARGARETS.

LOUISBURG SQUARE
BOSTON, MASS.

Heliotype Printing Co. 211 Tremont St. Boston.

HENRY VAUGHAN ARCHITECT. 10, PEMBERTON SQUARE.

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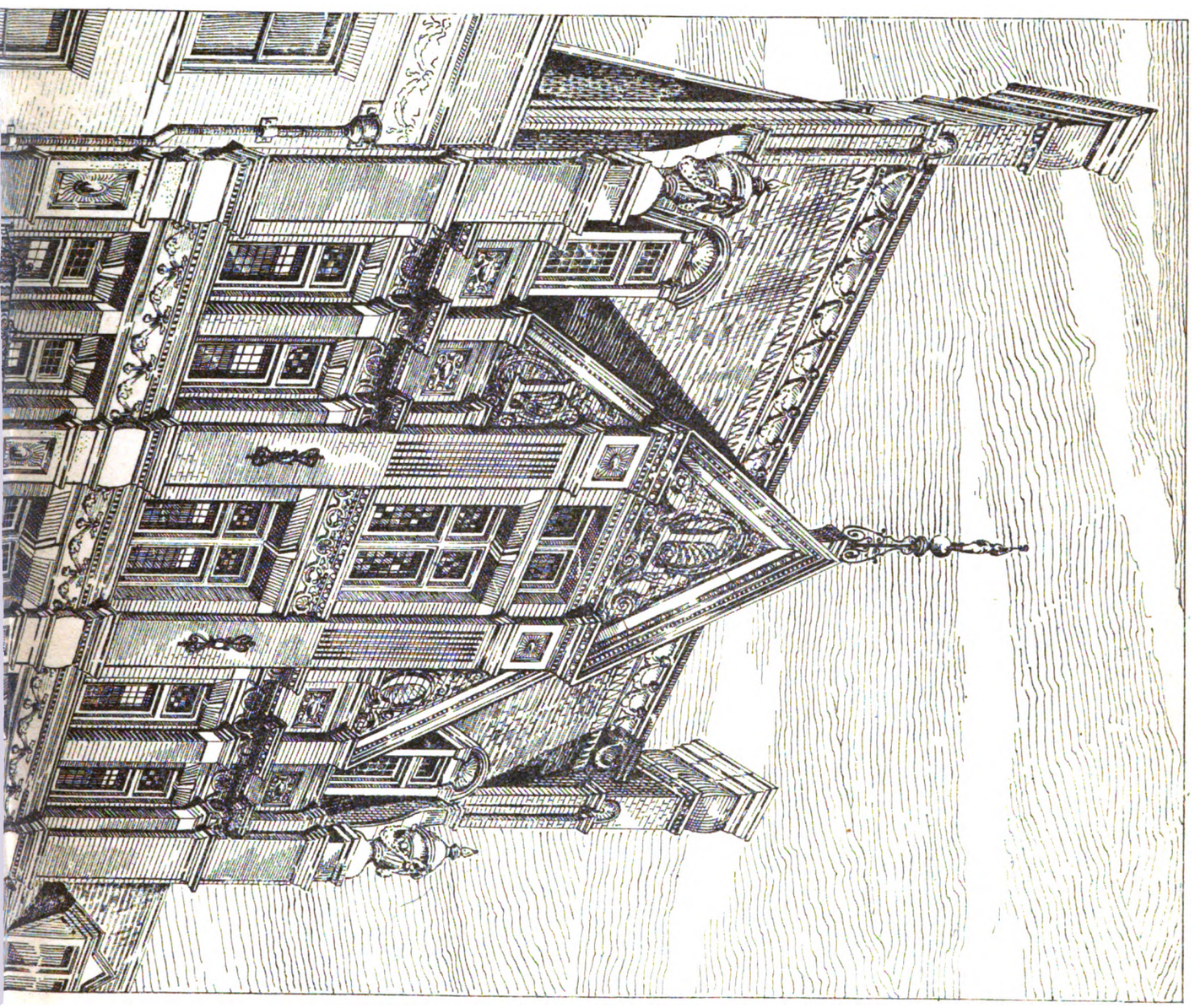

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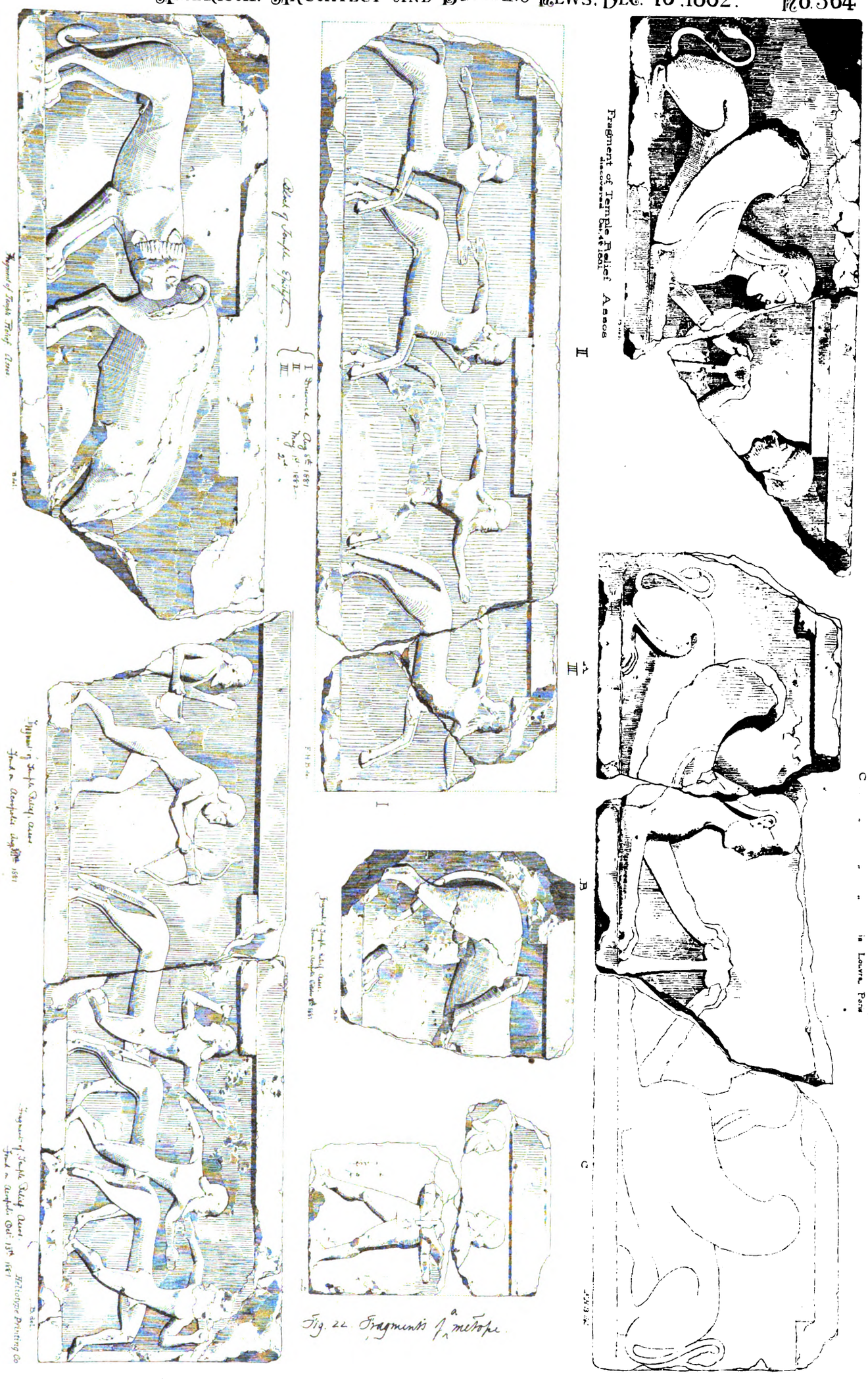

Fig. 22. Fragments of a metope.

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The Chapter, hearing of this high-handed outrage, sent to Councils a request that we might be heard before final action was taken on this bill. To our surprise the request was granted, and we were notified to appear before the police committee, to whose tender mercies the matter had been entrusted. Presuming that the ups and downs of the conflict would not be interesting to you, we omit the details, but take pleasure in stating that, notwithstanding violent political opposition, success attended us at every point. We drafted an ordinance which gives to every one so disposed the right to contribute toward the improvement of our city. . . . The enclosed ordinance was passed on June 1, and approved on June 7, 1882.

COPY OF ORDINANCE NOW BEFORE COMMITTEE ON POLICE.

AN ORDINANCE

To regulate the erection of oriel windows.

SECTION 1. *The Select and Common Councils of the City of Philadelphia do ordain*, That no bay or oriel window projecting beyond the building-line of any street shall hereafter be erected by any person upon the front of any building.

SECT. 2. Oriel windows may hereafter be erected upon the sides of buildings occupying corner lots, extending over the pavement of the street, from any story except the first, and to a distance of not more than four feet beyond the building-line.

SECT. 3. No oriel or bay windows, other than such as are specified in Section 2 of this ordinance shall be erected upon any buildings bounded by any of the streets in the city of Philadelphia.

SECT. 4. That whenever it shall come to the knowledge of any of the building inspectors or police officers of the said city, that any person or persons are erecting or causing to be erected, or are about to erect or cause to be erected, any bay or oriel window that shall project into the public highway from the front of such building beyond the building-line, it shall be their duty to report the facts to the Mayor, who shall forthwith notify the City Solicitor thereof, and the City Solicitor shall thereupon take such steps, by injunction or otherwise, as may be proper to restrain such erection, or to cause the removal of the same, if already erected or in process of erection.

SECT. 5 All persons who shall, after the passage of this ordinance, erect and maintain, or cause to be erected and maintained, any bay or oriel window from the front of any building shall be subjected to a penalty of five hundred dollars, to be recoverable as debts of like amount are now by law recoverable, and such bay or oriel window shall be removed as is hereinbefore provided. All ordinances or parts of ordinances inconsistent herewith shall be, and the same are, hereby repealed.

PROPOSED SUBSTITUTE.

AN ORDINANCE

To regulate the erection of oriel windows.

SECTION 1. *The Select and Common Councils of the City of Philadelphia do ordain*, That no bay or oriel window projecting beyond the building-line of any street shall hereafter be erected by any person upon the first story of the front of any building.

SECT. 2. Oriel or bay windows may hereafter be erected upon any fronts, sides, and rear ends of buildings, extending over the pavement of the street, from any story excepting the first, within lines drawn from the intersection of the party-lines and building-line, at an angle of twenty degrees with the latter, and to a distance of not more than four feet beyond it. That all oriel or bay windows already erected or being erected in conformity with the provisions of this section shall remain or be completed the same as if they were commenced after its passage.

SECT. 3. No oriel or bay windows, other than such as are specified in Section 2 of this ordinance, shall be erected upon any buildings bounded by any of the streets in the city of Philadelphia.

SECT 4. That whenever it shall come to the knowledge of any of the building inspectors or police officers of the said city that any person or persons are erecting or causing to be erected, or are about to erect or cause to be erected, any bay or oriel window that shall project further into the public highway from the front of such building beyond the building-line than allowed by Section 2, it shall be their duty to report the facts to the Mayor, who shall forthwith notify the City Solicitor thereof, and the City Solicitor shall thereupon take such steps, by injunction or otherwise, as may be proper to restrain such erection, or to cause the removal of the same if already erected or in process of erection.

SECT. 5. All persons who shall, after the passage of this ordinance, erect and maintain, or cause to be erected and maintained, any bay or oriel window from the front of any building, other than allowed by Section 2, shall be subjected to a penalty of five hundred dollars, to be recoverable as debts of like amount are now by law recoverable, and such bay or oriel window shall be removed as is hereinbefore provided.

All ordinances or parts of ordinances inconsistent herewith shall be, and the same are hereby repealed.

It is our painful duty to report the sad death, on May 20, from apoplexy, while working at his table, of our lamented late associate, James P. Sims. At a meeting of the Chapter held May 25, the following action was taken:—

Whereas, our highly-esteemed member, James P. Sims, having been removed by death, on the 20th inst., it becomes us to express the profound sorrow with which we are moved in view of the loss we have sustained by this great calamity; therefore,

Resolved, That in the intercourse, professional and social, that we have enjoyed with James P. Sims, his broad and genial nature, his noble bearing, and the generous impulses with which he was ever moved, lead us deeply to deplore his loss.

Resolved, That a copy of these resolutions, with an expression of our sincerest sympathy, be transmitted to his relatives.

Very truly, EDWARD HAZLEHURST, Sec'y.

THE ILLUSTRATIONS.

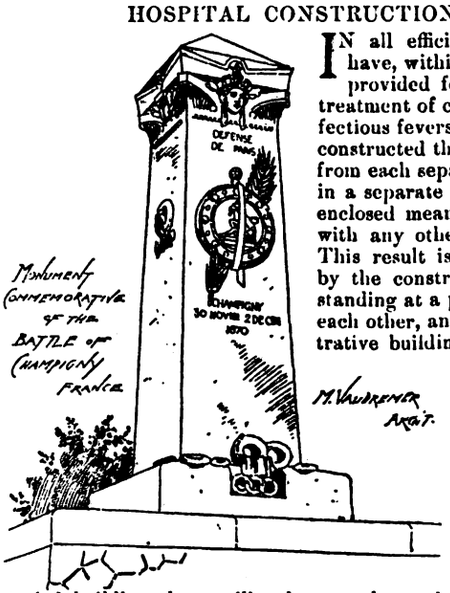
DESIGN FOR THE LIVERPOOL, LONDON AND GLOBE INSURANCE OFFICES, PHILADELPHIA, PA. MESSRS. HAZLEHURST & HUCKEL, ARCHITECTS, PHILADELPHIA, PA.

INTERIOR OF THE CHAPEL FOR THE SISTERS OF ST. MARGARET, BOSTON, MASS. MR. HENRY VAUGHAN, ARCHITECT, BOSTON, MASS.

SCULPTURES FROM THE TEMPLE OF ASSOS. DRAWN BY MR. F. H. BACON, ARCHITECT.

FOR description, see article elsewhere in this paper.

HOSPITAL CONSTRUCTION.—II.[1]


DEFENSE DE PASSER
Monument Commemorative of the Battle of Champigny France
CHAMPIGNY 30 NOVRE 2 DECRE 1870
M. Vaudremer Arct.

IN all efficient hospitals which have, within a recent date, been provided for the isolation and treatment of cases of different infectious fevers the buildings are so constructed that patients suffering from each separate disease may be in a separate building, having no enclosed means of communication with any other hospital building. This result is, as a rule, obtained by the construction of pavilions, standing at a proper distance from each other, and from the administrative building. In the case of a one-storied building, each pavilion contains, as a rule, two wards, one at either end, for each sex, the wards being separated in the centre by an entrance lobby and certain administrative apartments. In the case of a two-storied building the pavilion has a male ward on the ground floor, and a female ward upstairs, each floor having a separate lobby and administrative rooms.

In the arrangement of the buildings it has been found that the distance between the several pavilions, and between them and the administrative block, should, if possible, be equal to one and a half times their height when the buildings are of equal height, and, if otherwise, at least equal to the full height of the higher of the two adjacent buildings; also that the means of communication between them should be limited to a roofed passage, either entirely open at the sides or having permanent openings facing each other in the opposite side walls, or again, to a roofed passage fitted with a central partition and being completely open on both sides of the partition, the persons using the passage walking on the lee side of the partition.

In the case of a small-pox pavilion, it has appeared to me that the separation between it and the other hospital buildings should, if possible, be even more complete, and where such an arrangement can be carried out, that the administrative apartments it contains should be such as to reduce communication with the administrative block to a minimum. Especially should there be in connection with the pavilion separate sleeping accommodation for nurses. In some districts, as at Folkestone, the small-pox hospital is an entirely separate institution, situated at a distance from the hospital for the other infectious fevers. In several hospitals visited small-pox is not admitted.

With reference to the construction of the pavilions, regard has, in all good hospitals, been had to the conditions deemed necessary in the construction of a good dwelling-house. The foundations have been laid in a soil free from animal or vegetable matter; the whole ground surface of the site has been underdrained when necessary, and in some of the better examples of hospital buildings it has been covered with a layer of cement-concrete or asphalt, or it has been otherwise prepared so as to exclude both dampness and also emanations from the soil, which might subsequently become contaminated, as by accidental leakage from a drain. The walls have consisted of good bricks, of hard stone, or of a combination of the two, or of some similar material, such as concrete; they have been provided with an efficient damp-course; and with a view to the maintenance of an equable ward-temperature, it has been found necessary that they should be at least fourteen inches in thickness. It has also been found necessary to provide windows in each of the opposite side walls. The roof, whether of slates or tiles, has been in a great part or entirely ceiled within. Where, as in Sheffield, flat roofs have been made, they can conveniently be constructed of concrete, asphalt, or other similar material.

The floors, provided beneath with means of ventilation into the outer air, have in all cases consisted of wood, and when this has been both well-seasoned and so laid as to prevent the occurrence of spaces between the planks, the result has been fully satisfactory. Where such interspaces have taken place, they should at once be filled in with wood, or some other suitable material. The internal surface of the walls is best made of glazed bricks or of cement, so that they can be at regular and frequent intervals washed or otherwise cleansed. The glazed-brick walls, as in the Delancey Hospital, Cheltenham, are attractive, and admit of easy cleansing; and Parian cement when put on as at Weymouth, so as to present a hard, impervious, porcelain-like surface, is well adapted to the purposes of

[1] From the *Architect*.

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hospital wards. Ordinary brick or cement walls which are periodically lime-washed and then covered with a slightly-toned wash, are also neat and cleanly.

Architraves and cornices or other projections in connection with the walls have often, as at Weymouth, very properly been avoided, for they all tend more or less to harbor dust containing infective matter. For a similar reason flat ceilings are found preferable to any pitched roofs which need to be supported by projecting beams or rods.

The windows should be made for the purposes of ventilation as well as of admitting light, a point that has been overlooked in some of the more modern buildings, where I found that only small portions of the several windows were made to open. Having these objects in view, I am of opinion that a double-hung sliding-sash window is the one which is best adapted to the purposes of a hospital ward. These sashes are often surmounted by a third and smaller hinged-sash, fitted with side flaps, so the air entering from without shall be directed toward the ceiling. The lower frame of each sash-window may also, as in the Berkhamstead rural and the Weymouth port hospitals, be with advantage made with a deep bottom rail so that the sash may be opened to allow of the entrance, in an upward direction, of air between the meeting rails, whilst the window remained closed above and below. With a view of securing a cheerful appearance the bottom of the windows should not be more than about 3 feet above the floor level, and to ensure adequate movement of air in the upper parts of the ward, it has been found necessary that the top should not be less than some six inches, at the most, from the ceiling or the wall-plate, as the case may be. The best arrangement of windows is found to be that which provides for one between every two adjacent beds, and one near the angle of the ward beyond each end bed. Movement of air, and such ample light as tends to secure cleanliness, is thus ensured in those parts of the wards standing most in need of those requirements.

The amount of window-surface which it is desirable to ensure for a ward is a subject which has received some attention. Having regard to cheerfulness, to adequate means of lighting and ventilation, as also to the maintenance of an equable and sufficient ward-temperature, it has appeared to me that in a well-constructed and efficiently warmed building the amount of window-surface to cubic space should not vary much beyond the limits of 1 square foot to from 60 to 80 cubic feet; a proportion of about one square foot to every 70 cubic feet being, as a rule, the most advantageous. The experience obtained in the Children's Hospital at Pendlebury in this connection deserves special consideration, for, due regard being had to ventilation, the failure to maintain the ward air equably warm, and at the same time sweet, was to a great extent due to the excessive window-surface, which there amounts to 1 square foot for every 35 cubic feet.

Windows in the opposite side walls, whilst affording the principal means of ward-ventilation, and constituting indeed the only effectual means by which thoroughly and in a short time to change the entire ward air, as, for example, when all the windows are opened on the occasion of cleaning out the wards, do not, however, suffice for this purpose. The space between the floor and the bottom of the patients' beds is found always to require independent ventilation, as by openings into the outer air situated just above the floor level, and each capable of being closed by means of a small sliding door, on one or other side of the ward, according as the weather may temporarily necessitate. Similar openings near the ceiling level are also, as a rule, provided. "Tobin" tubes have occasionally been usefully resorted to. One or more vertical enclosed shafts passing from the ceiling through the roof are also, as a rule, requisite to carry off such air as is either too hot or no longer pure. But it must be regarded as certain that the provision of even excessive facilities for the escape of impure air, as by roof-shafts, should in no case be allowed to interfere with the provision of ample means for admitting fresh air into the wards, at a lower level.

Open fireplaces have, under most circumstances, been regarded as best adapted to ward purposes, and the additional means of ventilation they afford may be looked upon as especially useful in the case of wards occupied by patients suffering from infectious diseases. At least one such fireplace is found to be required for every 25 to 30 feet of ward length, and, where this limit is approached, those fireplaces which are provided with an air-chamber behind, by means of which warmed air from outside is passed into the ward, are, as a rule, used, because of the additional facilities they afford for maintaining a sufficient and equable temperature. Where wards exceed 30 feet in length, stoves occupying a position in the central line of the ward, and having an open fireplace both in front and behind, or similarly situated closed stoves so made as to throw warmed air into the wards, are mostly used to maintain a fairly equable and a sufficient ward-temperature. Apparatus for combined warming and ventilation was only met with in one instance; it is referred to in connection with the Children's Hospital at Pendlebury, near Manchester.

The ward-space which should be allotted to each patient is a matter of first importance in a hospital where the patients are themselves centres of infection. In the Board's Hospital Memorandum it is stated that the ward-space for each patient should approach, as nearly as circumstances allow, to 2,000 cubic feet and 144 square feet of floor-space. In most of the modern hospitals visited this amount of ward-space was nearly or quite reached; in a few instances it was somewhat exceeded; and, with one exception, I have found no reason to suggest that it should be exceeded. The exception relates to wards containing small-pox patients. In such wards a larger space between the beds seems indicated than is necessary for other patients, especially when many severe cases are under treatment. Under such circumstances it has been found difficult, even when the means of ventilation appeared ample, to keep the air in all parts of the wards quite sweet.

I am disposed to regard a standard of floor-space as necessary to be appointed quite independently of the standard of cubic space, and I should not consider a material excess beyond the required 2,000 cubic feet per bed as compensating for a material shortcoming in the required 144 square feet of floor-space; nor yet should I regard a more ample floor-space as compensating for an insufficient cubic space. In other words, it appears to me that the height ought habitually to be about 14 feet in wards that are intended to have rows of beds on their two opposite sides, or if it be more than 14 feet, the space above that height should not be taken into account in reckoning the cubic space.

The question as to the maximum of beds which should be allowed in any one ward devoted to infectious cases was borne in mind during the inquiry, but where large wards were met with they either lacked the adequate ward-space per patient, or they had not for some considerable time been in full use. Hence no experience on this point was available.

On several occasions the question arose whether children, whilst in a hospital for infectious diseases, needed the same amount of ward-space as is deemed necessary for adults, and it has appeared to me that the subject called for consideration quite apart from the more general one as to the air-space which should be allotted to children in dwelling-houses, or in general hospitals. The circumstances, indeed, are not analogous. Having regard to the general experience acquired, I am of opinion that if any reduction in ward-space is made in the case of children, the reduction should be but small, and that in no case should the space for a child in an infectious hospital be less than three-fourths of that which is deemed necessary for an adult.

In connection with each ward there must be one or more water-closets, or dry-closets, and a ward-sink. In all well-constructed hospitals both these apartments are contained in a building projecting from the main pavilion, being separated from the ward itself by means of a lobby, provided with a door leading into the ward, and having means of cross-ventilation by openings in its two opposite side walls. As a rule, windows made to open are relied on to secure this cross-ventilation, but they are, except in very warm weather, nearly always kept shut, and hence measures should in every hospital be adopted to ensure that this cross-current of air shall not be stopped by any action on the part of patients or nurses. This can be effected in several ways, as by the substitution of a fixed louvre for a part of or for the whole of one of the upper panes of glass. The closets and sinks may conveniently be placed side by side with doors facing the door leading from the lobby into the ward. The partition above the closet and sink doors should rise to the ceiling so as to shut these offices entirely off from the lobby; whereas the partitions separating them from each other should not be more than about 8 feet high, so that, by means of windows placed in the opposite side walls of the projecting building, an independent cross-current of air may be secured through them. Where water-closets are used both the apparatus known as a "container," as also the "D-trap," have in modern hospitals been carefully avoided, as tending to retain infection and cause nuisance. Wherever any form of dry-closet is in use, it is fitted with a movable receptacle, which needs to be emptied and cleansed at least once every day, the removal being effected through a doorway from without; this form of closet also requires to be subjected to frequent inspection, and an ample supply of the dry material used should be available for application. Dry earth and charcoal have both been found to answer this purpose. Ward-sinks require to be provided with means of flushing, and having regard to their use for ward slops, etc., water drawn from the taps with which they are fitted should not be resorted to for domestic or other allied purposes.

A separate bath-room is provided in most hospitals. If the bath be a fixed one, it is found expedient that the head alone should be fitted in contact with any wall, both sides being left free, in order that the attendants may have easy access to the patient using it. A movable bath is, however, as a rule, found necessary as well as a fixed one, especially in scarlet-fever wards, where bathing often forms an important part of the treatment adopted. One movable bath at times serves all the requirements of a small pavilion, and in some of the smaller hospitals, where no separate bath-room has been provided, the bath is made to stand in a lobby over a sink, to which hot and cold water are laid on, and over which it can be emptied. Bathing in the wards is, however, not as a rule desirable, except when the circumstances of the patient render it necessary.

In connection with each ward-pavilion an entrance lobby and certain administrative apartments have in nearly all cases been provided. In the one-storied pavilions these occupy, as a rule, a central position, and the minimum they consist of is (1) a nurse's room fitted with fixed windows, commanding a view of either ward; (2) a room in which to store such food and other articles as are in constant use; and (3) a linen store. Where no additional rooms are provided, the nurse's room is often fitted as a ward-kitchen, in which articles, such

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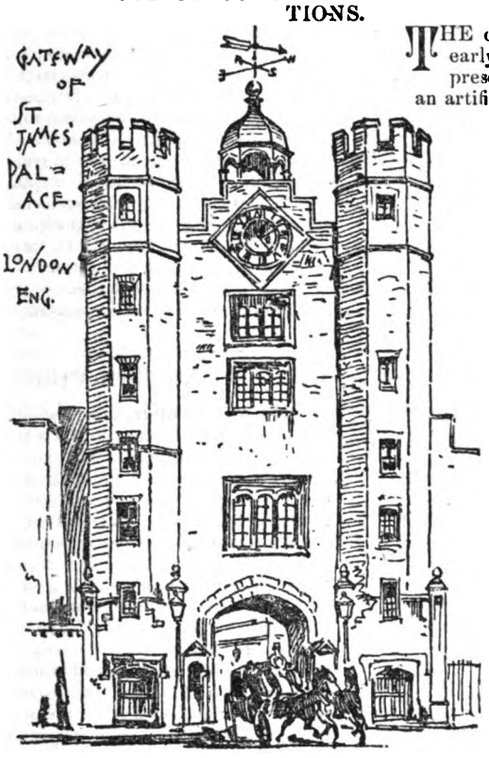
as beef-tea, etc., can be cooked or kept warm, and it is also provided with a scullery-sink, an arrangement which is the less objectionable because nurses should not, unless under very occasional and exceptional circumstances, sleep in the rooms adjoining the wards. In the two-storied pavilions similar apartments occupy that end of the ward which adjoins the entrance lobby, and in which the staircase is fixed.

ON THE USE OF CONCRETE IN MARINE CONSTRUCTIONS.



THE discovery in the early part of the present century of an artificial cement suitable for building purposes, and possessing in addition to great power of adhesion the extremely valuable property of developing its adhesive strength most favorably when submerged in water, forms probably the most important incident in the history of marine construction; and when it is further considered that such a material in the form of Portland cement has been readily obtainable at moderate cost it is only natural to expect that a great revolution should occur in the mode of constructing breakwaters, quay-walls, and other similar structures. That a considerable change has taken place, is indicated by the now general use of large artificial blocks involving various forms of heavy machinery for their manipulation.

A review of some of the more recent harbor works in this and other countries leads, however, to the conclusion, that while the superior adhesive power of cement, and the rapidity of its development have been duly recognized and made use of, as, for example, in the building of concrete blocks on shore above high water, the more characteristic and not less important property, so far as hydraulic work is concerned, of setting after submersion does not seem to have received quite as much attention as it deserves, or to have been hitherto sufficiently taken into account in modifying the design not only of marine works, properly so called, but also of many other structures of equal importance, the foundations of which are laid under water. Nor does it appear improbable, when full advantage is taken of the hydraulicity of cement, that increased skill in the manipulation of plastic concrete under water, will enable the larger rivers and estuaries to be economically bridged over, and will diminish the necessity either for excessively long spans, such as have in many cases been adopted for tunnels, the length of which and other circumstances render the cost of their healthful ventilation all but prohibitory.

Much has been written regarding Portland cement, and many elaborate investigations have been made of its tensile and compressive strength, the former being used as a test of quality. In most cases, however, and particularly in that of concrete, the chief function of cement is to convert a quantity of loose material into a solid mass, and the excellence of properly proportioned concrete will, other things being equal, depend almost entirely on the *adhesive* strength of the cement used. It therefore appears somewhat remarkable that the test of *adhesion* has not been employed to determine the quality of neat cement in preference to the much less appropriate, and in some cases, misleading tests of *cohesion* now so generally adopted.

As evidence that Portland cement possesses the property of developing adhesive strength under water to an extent calculated to meet all the requirements of practice, it may be stated, that in the case of the softer building stones, as for example, Portland and sandstones, we have found from repeated experiment that on forcing asunder pieces of these stones which had been cemented and *immediately* afterwards immersed in water, the adhesive strength developed in twenty-eight days was sufficient to tear out small fragments from the cemented surfaces of the specimens. It will perhaps be more convenient to reserve further remarks on this and some other parts of the subject relating to the submersion of plastic concrete until we have briefly reviewed the modes of construction adopted in some of the more recent harbor works, selecting a few representative examples.

The South Breakwater at Aberdeen furnishes an instance in which concrete was used in four different forms, involving different modes of deposition.

At eight hundred feet from the shore end the foundation course consists of jute bags filled with concrete, and varying in weight from 5 tons to 16 tons each. The bottom on which they rest consisted for the most part of gravelly clay, covered with large stones; the latter were removed by divers, and the bags lowered into place in iron skips, furnished with hinged bottoms and triggers; the bags were submerged while the concrete was in a plastic condition, and the divers were thus enabled to manipulate them so as to accommodate the inequalities of the bottom, and at the same time form a level surface on the top to receive the superstructure. The proportion of cement used in this part of the work was one part cement to six parts of a mixture of sand and gravel.

On this foundation course, concrete blocks 4 feet high by 6 feet wide, and varying in weight from 7½ to 24 tons each were laid in courses to a level of one foot above low water of neap tides; these blocks were lifted and lowered by two 25-ton steam travelling-cranes supported on a strong timber staging, and were set in position by the divers. In the block-yard a 25-ton steam and two overhead hand-cranes of 15 and 20 tons respectively, working on suitable gantries, were employed to handle the blocks. The proportion of cement in this part of the work was one part cement to nine of sand and gravel. The upper portion of the breakwater above low-water of neaps was formed of concrete *in situ*, filled in between suitable frames, and laid in such lengths that the filling could be carried up in advance of the rising tide, so that the upper surface of the concrete was always kept above water; the proportion of cement in this part of the work was one part cement to seven parts of sand and gravel; occasionally in fine weather, and when not likely to be injured by the wash of the sea, the proportion was decreased to one of cement and nine of sand and gravel.

To prevent the toe of the breakwater from being undercut, an apron was provided, consisting of long bags of plastic concrete, weighing 100 tons each, and dropped into place from a box about 8 feet wide by 6 feet deep, having a hinged bottom, and supported on brackets fixed to the side of the finished part of the breakwater, some feet above high water. This method of protecting exposed footings had never before been adopted, and would no doubt prove extremely effective, provided the bags retained their form and were not burst before their contents had hardened. The concrete for this and the other portions of the work was made by four of Messent's mixers, driven by an 18-horse-power engine, each mixer turning out twelve cubic yards per hour; materials for the concrete and also stone were obtained within easy distances. The number of divers employed was thirty-two, their wages averaging 66*s* per week, viz., eleven shifts of four hours each at 6*s*.

The breakwater has a length of 1050 feet, and the total cost of its construction given by Mr. D. Cay, in the revised statement of expenditure following his lucid description of the work,[1] has been about £78,000; the cost of plant, temporary buildings, etc., was somewhat under £30,000. Deducting £10,000 for the estimated selling value of the plant, etc., after completion of the work, and dividing the balance of £20,000 over the different items, their relative amount and cost is stated to be approximately as follows, omitting interest on the first cost of the plant, which will be further alluded to.

Excavating foundations.....£4,904

	Cubic Yards.	Cost per Cubic Yard. £ s. d.
Concrete in foundation course	3,202	1 15 5
" apron	1,336	1 17 0
" blocks	22,851	0 16 1
Block setting	"	0 11 5
Concrete *in situ*	23,972	0 18 7

The cost of the timber staging is put down at £10,292, which although considerable, can scarcely be regarded as excessive, when it is remembered that heavy crane machinery and blocks had to be carried at a considerable elevation above high water and in an exposed position. Portland cement stored at the works cost 43*s* per ton.

The most noticeable feature in the construction of the Aberdeen breakwater is the use of the 100-ton bags of concrete, and the method of depositing them; their cost, however, as well as that of the smaller bags in the foundation-course does not compare favorably with the other portions of the work; the superior economy of concrete *in situ* is also well illustrated. The total contents of the breakwater below low water amounted to a little over 27,000 cubic yards, of which about 23,000 cubic yards had been allowed to harden or "set" in air, the remainder in water. Preparations for commencing the work were begun in May, 1869, and the breakwater was completed in September, 1873; during this interval 51,361 cubic yards of material were deposited at the average rate of nearly 1,000 cubic yards per month, or taking three hundred working days to the year, an average of about 40 cubic yards were deposited per day. If larger blocks, say, for example, of fifty tons each had been used, the rate of progress would, no doubt, have been somewhat greater,

[1] Minutes of the Proceedings Institution Civil Engineers, xxxix.

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but on the whole, the experience gained at Aberdeen cannot be considered as favorable to the use of moderate-sized blocks, the cost of fixing them in place exceeding two-thirds of the cost of the block itself; a similar comparison with respect to the concrete in bags shows the setting to cost rather more than the material set. These comparisons are to some extent admissible, as the price of concrete —allowance being made for differences in the proportion of cement —should not vary much beyond moderate limits, for sand and gravel can generally be obtained close to the site of the works, and the difference in the cost of cement in other countries is frequently compensated by the reduced price of labor.

It is a matter of importance in marine constructions to provide means for the rapid deposition of the building material, particularly under water, so as to enable full advantage to be taken of the comparatively limited intervals of calm weather, during which the work can be most satisfactorily and economically proceeded with. One of the weak points of the system adopted at Aberdeen — and noticeable also in similar works at other places—was the large amount of diving-work required. In even moderate depths and particularly when exposed to tidal or other currents, diving operations are so extremely slow and expensive that any system involving much work of this description must be considered more or less defective and unsatisfactory.

The method of building with blocks is open to this general objection, that it always involves the accurate levelling of the foundation, whether natural or artificial, which is a tedious and costly operation in the great majority of cases; each block has also to be carefully placed in its proper position under water, and this can rarely be accomplished without the assistance of divers and their attendant encumbrances. It is further objectionable that under such circumstances the engineer is placed to an undesirable extent in the hands of his divers, whose reports he must as a rule accept, and carelessness on the part of the diver, to which on account of his encumbered condition there is considerable temptation, can seldom be detected in time to have it properly remedied.

A system therefore in which the employment of divers was reduced to a minimum, or practically dispensed with — and that such a system is in many cases possible there is little reason to doubt— would, other things being equal, have much to recommend it, and would probably supersede many of the methods at present adopted.

It has been a frequently expressed opinion that blocks of a much larger size than those used at Aberdeen would have been preferable; this, however, if they were manipulated in a similar manner would necessitate an extremely massive sea-staging, and very heavy machinery requiring almost a prohibitory outlay, the cost of the former item in the case under consideration amounting to over £10,000.

Other methods of lifting and lowering large masses of built concrete, in which the use of a sea-staging is avoided, will be subsequently referred to, but that they are capable of being economically employed in exposed situations is extremely doubtful.

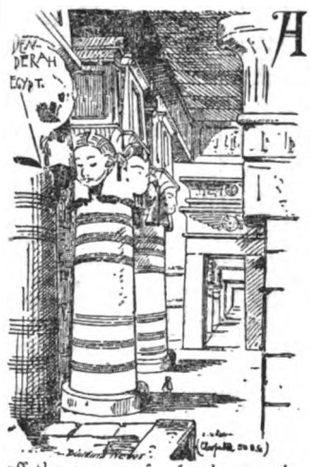
With respect to the statement of expenditure on the Aberdeen works, we should be disposed to suggest the following modification: as before noticed, the total expenditure on the breakwater amounted to £77,973; of this £29,723 was expended on plant, including sea-staging, etc., the estimated value of which, after the work was finished, is assumed to have been £9,878; from this sum, however, is to be deducted for the purpose of comparison with other works, interest on the first cost of the plant, amounting to about £6,300; making the net total cost about £74,400. The following is a summary of the approximate quantities and prices connected with the work, adopting the modification referred to:

Total length of breakwater	1,050	lin. ft.
" contents of breakwater	51,361	cub. yds.
Quantity per lineal foot	48.91	"
Total net cost	74,100*l*	
" " " of plant	25,115*l*	
Cost per lineal foot of breakwater about	70*l*	
Cost per cubic yard of finished work	29*s*	

The selling value of old plant and materials is difficult to estimate and liable to be overrated, particularly if the former is of special construction or design. For the purpose of instituting a comparison in such cases it will perhaps be sufficiently near the truth if the average selling value of the plant is taken at one-fourth of the first cost.

In comparing the cost of special plant with that of work executed it is expedient, in order to avoid complication, that the latter item should be confined to the amount actually effected by the direct use of the special plant, and that other parts of the structure which may have been built quite independently should not be included. For example, if the superstructure in one case was of rough concrete extending only a few feet above high water, and in another it consisted of a large quantity of expensively dressed ashlar, carried from low water to a considerable height above high water, although in each case the special plant may have done the same amount of work, it is obvious that a comparison which referred to the whole cost of each of the finished structures would be misleading. Applying these restrictions to the case of the Aberdeen works, and limiting the special plant to "cranes," etc., and "sea-staging," we may assume the united first cost of these items to be about 20,000*l*., which, with interest at 5 per cent. for 4½ years (the time occupied in construction) amounts to 24,300*l*., from which is to be deducted one-fourth of the first cost as the selling value when the work had been completed; the approximate net cost would therefore be about 19,000*l*. The special plant was directly employed in all the work except the superstructure deposited while plastic above low-water containing 23,972 cubic yards, which being deducted from the gross quantity of material in the breakwater, makes the total work done by the direct use of the special plant to be 27,400 cubic yards which were lifted and lowered into place under water, at an approximate cost for plant alone of about 14s. for each cubic yard deposited. The accuracy of these figures may be questioned on the ground that all the cranes may not have been exclusively used with the blocks and bags. Any discrepancy on this account, however, would probably be more than counterbalanced by other items, the cost of which is not included. Of course, other things being equal, double or treble the quantity of work might have been done by the same plant, in which case only the additional interest for the increased period of use would have to be taken into account. The cost of the special plant as given above, and the amount of work executed, will, as we shall show on a future occasion, compare favorably with the same items in some other works of a similar character. On the whole the south breakwater at Aberdeen forms an important example of marine construction in an exposed position, and reflects much credit on the engineer in charge, Mr. W. D. Cay, the difficulties of the case being met and overcome with considerable skill and originality. In a future article we shall deal with some other modes of employing concrete in marine construction. —*Engineering.*

AMMONIA FOR EXTINGUISHING PETROLEUM FIRES.



A COMMITTEE of the Polytechnic Society of Munich has issued a report on the means to be employed for extinguishing burning petroleum. They say that since concentrated water of ammonia evolves a great amount of gas when heated, and as this gas is unable to sustain the combustion of any burning substance, burning petroleum must also be extinguished for want of oxygen if brought into a space filled with ammonia-gas, and it may be safely asserted that petroleum will not continue to burn even in a room filled with atmospheric air, when there is a considerable quantity of ammonia-gas mixed with the air, assuming, of course, that the place is closed so as to prevent a free interchange of air and cut off the access of a fresh quantity of oxygen to support combustion.

A second condition necessary for success, which is intimately associated with the first, is that the space be not much larger than that of an ordinary house-cellar, so that there shall be only a small number of barrels of oil, as is the case with a retail dealer. It may be assumed with certainty that it would be in vain to attempt to put out a fire in a large storehouse with ammonia.

Finally, the third condition is that the ammonia be used in large amount and of sufficient strength. The ordinary commercial aqua-ammonia has a specific gravity of 0.906, and contains nearly ten per cent by weight of ammonia-gas; but it can be made a good deal stronger, for *cold* water absorbs so much ammonia-gas that when the water is perfectly saturated with this gas the solution contains nearly forty-seven per cent of ammonia. The stronger it can be used, the more gaseous ammonia will be evolved on heating it, and the more efficient it will be for extinguishing a fire; but in no case should ammonia-water be used that has a higher specific gravity than 0.960, and hence contains less than ten per cent of gas.

Unfortunately it is impossible to say definitely how much ammonia ought to be kept in a petroleum room as a precaution against fire; for while it is easy to determine the cubical contents of the room, experience is lacking to tell what volume of ammonia must be mixed with a given volume of air to extinguish a flame in it. Nor is it possible to tell how much of the ammonia which is there will be evaporated if a fire breaks out, and how much ammonia-gas will be evolved and mixed with the air; yet there will only be a greater or smaller portion of ammonia liberated according to how much heat is produced.

In 1881 Schlumberger proposed to extinguish a fire in a petroleum store quickly at the outset by keeping a large, closely-stoppered bottle of concentrated ammonia on every barrel, so that in case of a fire or explosion the bottles would break and the evolved fumes of ammonia prevent the fire from spreading any further. Schlumberger employed this simple method with the best results in his extensive experiments on the distillation of petroleum.

Assuming that a large bottle held 10 litres of water of ammonia, and this contained but 10 per cent of gas, so that in the 20 litres there is dissolved not quite 2 kilos (1.920 grammes) of ammonia, and if on the breaking out of a fire only half of it vaporizes or is converted into gas, it would still fill quite a large space with ammonia-gas. The weight of a litre of ammonia-gas is at 0° C. and under the normal pressure only 0.7617 gramme, so that one litre of liquid ammonia would produce 1.313 cubic metres (48½ cubic feet) of gaseous ammonia, measured at the freezing point of water. At

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the high temperature produced by the burning oil the gas would naturally expand and fill a much larger space.

It must also be remembered that Schlumberger's proposition to put a large bottle of ammonia on each barrel could be easily carried out without interfering at all with business. The cost of ammonia can scarcely stand in the way of its use for prevention of petroleum fire from spreading, because at retail 100 kilos (220 pounds) can be had for $9.25. If no fire takes place none of it is lost, and when it is no longer needed it can be easily dispensed with.

The use of water of ammonia as a prevention of petroleum fires, or rather to extinguish a fire that breaks out in a small store of it, ought to attract the attention of companies and societies concerned in extinguishing fires, and although the matter has not yet been so thoroughly tested that the owners of these storehouses can be *compelled*, as Schlumberger proposed, to keep closed bottles full of ammonia in the cellars where petroleum is stored, it might be well to recommend that this should be done, leaving it to the owners, if they would consult their own interest, to carry it out. — *Deutsche Industrie Zeitung.*

An illustration of the action of ammonia-gas in extinguishing flame was afforded, says the *Scientific American*, recently at a fire in Scharmann's brewery, in Brooklyn, E. D. While repairing the Delamater ice-machine the ether vapors took fire, and an explosion followed which enveloped the whole building in flames. As a result of the heat the ammonia-machine exploded and liberated such an enormous amount of ammonia-gas that it checked the fire and prevented it from spreading to the neighboring buildings.

ANCIENT SALAMIS.

THIS hole, Famagusta, Cyprus, containing some five hundred starving wretches, was the famous city with its six hundred churches, and 800,000 inhabitants over which Greeks, Romans, Turks, Venetians, Egyptians, and a host of other nations fought so desperately. This is the port which contained a fleet of three hundred war-ships, and was the most prosperous commercial one in the then known world. This is part of the ancient Salamis, whose kings were mighty and whose maidens were "most beautiful to see," and it was from this city that the oppressed sought assistance. Herodotus tells us that when Pheretime and her son Archisilaus, ruler of Cyrene, were driven out of their country the mother fled to Salamis, in Cyprus, and to use his own words: "At that time Evelthon bore rule over Salamis, the same who dedicated the curious censer at Delphi, which is deposited in the treasures of the Corinthians. Pheretime, having come to him, asked for an army which should reinstate them in Cyrene, but Evelthon would give her anything rather than an army; but she, accepting what was given, said: 'This indeed is handsome, but it would be still more handsome to give the army she asked for.' This she said at every present that was made. At last Evelthon sent her a golden spindle and distaff, and some wool was on it, and when Pheretime again made the same speech, Evelthon said, 'that women should be presented with such things and not with armies.'" That greatest of historians would indeed be astonished if it were possible for him to revisit Salamis, for not only would it be impossible for him to find a king, a queen, a city and valuable presents, but he would have great difficulty in finding a spindle and distaff, and greater difficulty in discovering the woman to use them.

There is something unnatural in the sudden fall of this city, as only two hundred years ago its glory was great, and nothing but Turkish misrule, massacre, plunder and neglect, the latter of which subjected the district to terrible pestilences, can have caused the precipitous ruin of Famagusta. As I rode down the mountains and through the dreary Messaria plain, which reminded me so much of my native Egyptian desert, I could see what indeed appeared to be a magnificent and enormous town. Two long solid breakwaters, which would now cost millions of pounds sterling to build and which have, without any repairs whatever, withstood the action of the mighty sea for centuries, stretch far out from the shore, another smaller one forming the inner harbor, which gave refuge to more than three hundred battle-ships, but is now full of mud, while massive and beautiful architectural fortifications several miles in circumference surround the city, which in the distance appeared to be covered with gigantic buildings. The nearer, however, I approached to this place the more I could see of the ruin, as, although the breakwaters and fortifications lost nothing by proximity, the town itself resembled a place that had just been bombarded and then burnt. It makes one sad to see these things, and the nearer one approaches the sadder one feels. My own feelings as I rode over the drawbridges, of which three have to be passed before the inner circle is reached, were those with which I have always been seized on entering catacombs, and Famagusta is nothing more nor less than an enormous burial-ground beneath which lie its past glory and greatness.

Upon entering the town I found the old streets to be intact, and superbly paved with large square granite flagstones, and although few, very few, of the old habitations are left standing, all the foundations are intact, and being built of large marble and granite blocks, they stand firm about ten or twelve feet above the surface. I often fancy that some mythological or Buddhist giant has taken an enormous razor with which he shaved this city, and then allowed the beard a few days' growth, as, with the exception of a few churches, all the ruins stand at the same height, their tops being wonderfully even. It is evident that the upper parts of these structures could not have been as solid as their bases, and that earthquakes, time and sacrilegious hands have destroyed them, leaving the massive foundations intact. The Commissioner of the district tells me that before the British occupation these buildings were being barbarously pulled down and the material carted off to other towns in the island, or actually shipped to foreign ports. The stone is of excellent quality, and is cut into nice square blocks, and the Turkish Caimakam sold millions of tons to M. de Lesseps for the Suez Canal, and Messrs. Greenfield & Co. for the Alexandria Harbor works, and in a very few more years not a stone would have been left to guide the archæologist in his search for the remains of the once famous town which was a kingdom in itself. The very fortifications were sold to a French company in Smyrna, but happily the Turks gave up the island before a stone had been touched, and one of the very few beautiful intact Venetian monuments may now remain as a wonder to architects, engineers and artillerymen forever. It would take a volume to describe these tremendous works, on the top of which ten carriages may be driven abreast, and which remain to this day in spite of earthquakes, Turks, time and plunderers, perfect and complete in every respect, even to the drawbridges — which are so well balanced that I amused myself with opening and shutting the ponderous machines — and to the artistically decorated bronze Venetian guns, all in place and pointed at the imaginary invader, by sea and by land, ready to do their deadly work again if the universe could only go back two hundred short years. I have touched the iron spikes upon which the victorious Turkish Pasha caused the Venetian officers to be impaled. I have, without any difficulty, read the tablets of the many local heroes, and the marble slabs of rules and regulations to be observed by officers and men doing duty in the fortifications, and have drawn water from one of the four hundred and twenty wells with which the far-seeing Venetians had provided the place so that they could resist a prolonged siege without any fear of their water-supply being cut off.

Inside the town the only ancient buildings standing are three cathedrals and a few churches, all of which are now places of Mahometan worship. When I say all, I make a mistake, as one of the prettiest has long been used as a storehouse for the grain collected as Government tithes, and incredible as this sacrilege may appear, is so used at the present moment by the enlightened English nation. The only building that can be compared to the Famagusta cathedrals in richness and architectural beauty is St. Mark's, at Venice, and although the Turks have done all they possibly could to change their appearance from Christian churches to mosques, by pulling down the steeples, erecting minarets in their places, and filling in the bas-reliefs with mud, the buildings still have enough of the grand and magnificent left about them to delight and interest lovers of the beautiful. All the carved stone windows have been either demolished or roughly built up, while the hundreds of vaulted chambers which surround the sides looking upon the streets, and which were evidently used as business stores, are fast decaying, and the marble and granite grave-stones, every one of which covered the remains of a hero or a cardinal, are smashed to atoms. Upon entering these edifices one is shocked to find the whole of the interior — roof, walls, columns and all — one mass of whitewash, but when the experienced traveller makes a closer examination he feels thankful that such is the case, and for the following reason: It appears that when Famagusta fell into the hands of the Turks, their first step, after putting all the male inhabitants to death, was to turn the churches into mosques, and as it would have been too great a trouble to destroy all the paintings, mosaics and bas-reliefs, they were simply plastered over and then whitewashed. Coats upon coats of lime have been put on at various times until their original state has been forgotten, and now, under this ugly whitewashed column, with a little perseverance, I find a magnificent alabaster pillar, while the next one turns out to be real verde-antique marble, now worth more than its weight in silver, and every inch of the walls is covered with paintings, mosaics or chiselled works of great value. Whether the British Government will take steps to have these monuments preserved or not remains to be seen; all that the new rulers of the country appear to be doing just now being to squeeze taxes out of their lately acquired subjects.

Ever since I have been here I have been wondering if the terrible sand-cloud which has so often ruined Syrian, Arabian and Egyptian towns, even sinking ships at sea with its enormous weight, has had anything to do with the destruction of this place, and this idea is gaining ground with me since I found out that the natives, instead of calling it Famagusta, call it Ammochostos, which is the Greek for "buried in the sand."

Nobody ever sleeps in Famagusta, as, although the Government offices and all the business places of the district are within the fortifi-

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cations, the people only go there in the daytime. Anybody sleeping there would be certain to be seized with fever of a dangerous character; whereas the little village, only half a mile distant, where the officials and others spend their evenings and nights, is one of the most healthful spots on the island, and is surrounded by trees and shrubs none of which can be made to grow in the town, as the climate, besides being injurious to man, is the same to beasts and even to plants. — *Correspondence of the New York World.*

THE CINCINNATI CHAPTER, A. I. A.

The Cincinnati Chapter held its regular monthly meeting on the 5th inst.

Mr. John Moser of Atlanta, Georgia, presented the chapter with "Grüner's work on the Dom of Orvieto," also with plates showing in color the decoration of her Majesty's Summer Pavilion at Buckingham Palace. This presentation was made in "Commemoration of the courtesies extended the 16th Annual Convention of the Institute by the Cincinnati Chapter." The books were accepted with thanks. Mr. L. F. Plimpton read an interesting and instructive paper on "Architecture in Monuments." The paper was generally and profitably discussed.

The paper for the January meeting will be by Mr. A. C. Nash; subject, Ventilation and Acoustics.

The movement lately inaugurated whereby the students in the several offices visit every Saturday afternoon some building in process of construction was reported as working satisfactorily, and that there was no doubt but that great good would result to the student as well as his principal.

WORMS IN HARD-WOODS.

Wheeling, W. Va., December 6, 1882.

To the Editors of the American Architect: —

Dear Sirs,—The worm-eaten timber of the Andover Church calls to mind a similar experience I had last year in a large warehouse I designed for Mr. Snyder of this city. In the third and fourth stories, the floors were supported by a number of young white-oak posts, twelve inches square. These posts were painted as soon as placed in position, with a thin coat of white-lead paint; shortly after this was done, it was noticed that some sort of a worm was working its way out of the post, from under the paint, and they increased in number to such an extent that it really seemed necessary to stop their further ravages, or the posts would be destroyed. One or two coats of carbon oil served to destroy the pests at the time and there is no indication that they will attack the posts again. I made inquiry at the time of several persons who dealt and worked in hard-woods for information, and I was told that it was not an uncommon thing to find small worms working in hard-wood, such as ash and oak used for pick and shovel handles, unless proper attention was given to the felling of the timber, and the handling and storage of the same, even after the timber had been worked into shape and placed on the market. In the case above cited, the worms had evidently attacked the timber before the priming coat of paint had been applied; but had escaped notice until they began boring out, and the wood-dust or flour exposed their operations. The worms were about one-fourth-inch long, and one-sixteenth-inch diameter, and had a cream-colored body and black head. They bored in a circuitous route under the surface, and not to any great depth. Hereafter, I shall advise timber of this kind to be treated with one or two coats of carbon oil before being placed in the building. Respectfully, S. M. Howard.

WAX FINISH.

Patchogue, L. I., December 7, 1882.

To the Editors of the American Architect: —

Gentlemen,—Will you kindly inform me through your columns, how to make the hard-wax finish for floors and wood-work, or if it is a manufactured article, where it can be obtained. I have tried wax in almost every way one can think of; but it invariably leaves something to be desired, and is too much work to use.

Very truly yours, J. Cox.

[The best hard-wax composition we have ever seen is manufactured by Chas. Butcher & Co., 171½ Tremont St., Boston.—Eds. American Architect.]

COMPETITION DRAWINGS.

Minneapolis, December 4, 1882.

To the Editors of the American Architect: —

Dear Sirs, — Will you kindly inform us if the plans and sketches for your competition will be returned, if return postage is sent you?

Architect.

[All drawings, whether competitive or otherwise, sent to us for publication, are carefully handled and returned uninjured to their authors. — [Eds. American Architect.]

NOTES AND CLIPPINGS.

Bronze Statue of Liberty for Waterbury, Conn. — A bronze statue of Liberty for a column 50 feet high has been modelled by the sculptor Bissell, of Poughkeepsie, and will be erected at Waterbury, Conn. She has a flag in her right hand and her face and movement are excited At the foot of the column a squad of soldiers, also in bronze, are falling into line. The base is square and will have on its four sides bronze statues representing Victory, a farmer, a mechanic, and a mother with children.

The Siphonage of Traps.—We are amused at finding a correspondent of the *Sanitary Engineer*, a San Francisco plumber of large experience, speak thus of Colonel Waring: "While we are willing to admit his ability as an engineer in large works, I think the matter in question was a subject with which he did not have any *previous experience*, and therefore in justice his deductions should only be entitled to the same consideration that would be shown to the amateur sanitary engineer who should, etc." We can imagine how Colonel Waring will relish being styled an inexperienced amateur, and in his absence, we can safely assure the writer that whatever may have led to the formulation of such unexpected recommendations want of experience with every least detail of plumbing certainly was not one of the causes. We do not propose to take one side or the other in the discussion and we hope that the disagreeing doctors may soon have an opportunity of making a set of experiments under their mutual planning and supervision; for we can hardly suppose that either Colonel Waring's or Mr. Philbrick's present belief is unaffected by the differing results obtained by the other. Meanwhile, we hope to be able to publish the results of a series of elaborate and accurate experiments extending over a period of several months, that have been made by two competent observers, who had begun their researches long before the publication of the National Board of Health's reports, which will throw new light on the vexed question of the ventilation of traps.

Seismology. — A utilitarian branch of seismology has been a study of the effects which have been produced upon buildings. Walls with openings in them, which run parallel to the direction in which there is the greatest motion, appear to be more cracked than those at right angles to such directions. At the time of an earthquake existing cracks in a building have been found to open and shut. Records of these motions have been obtained by means of specially contrived indicators placed across the cracks. Other cracks which had been marked and dated at their extremities appear to have extended. The effects of placing brick chimneys with wooden houses, giving too steep a pitch to a roof, causing arch-ways over doors and windows to meet their abutments at sharp angles, have been objects of observation. The difference in the effects produced upon buildings like those of the Japanese, which simply rest upon the surface of the ground, and those which by means of foundations are firmly attached to the soil, have yielded instructive lessons. In short, it would seem that for earthquake countries architecture requires considerable modification. In England the principal elements which enter into consideration are stresses and strains produced by gravity acting vertically. In an earthquake country we have in addition sudden stresses and strains arising from forces applied more or less horizontally.— *Nature.*

A Telegraph Pole Decision. — Justice J. O. Dykman, holding a special term of Supreme Court at White Plains, in Westchester County, N. Y., rendered his decision in the suit of C. Coles Dusenbury against the Mutual Union Telegraph Company recently. The suit brought by Mr. Dusenbury was a test suit, in which many other residents of White Plains were interested. It demanded the removal of the telegraph company's poles from Broadway and Spring Street, in that village, where they had been placed after the village Board of Trustees had refused the company permission to put them up. Justice Dykman decided that the plaintiff must have judgment on the ground that the telegraph company had no right to place its poles in front of Mr. Dusenbury's lands without making previous compensation.

A Faure Accumulator Company. — Articles of incorporation were recently filed in the New York County Clerk's Office of the Faure Electric Storage and Light Company, with a capital stock of $2,000,000, divided into 20,000 shares of $100 each. The object of the company is to manufacture, purchase and sell all kinds of electrical apparatus and machinery, to acquire patents relating in any way to electricity or to machines connected with electricity for lighting, storage and other purposes, and especially to acquire and work all patents and inventions of Camille A. Faure and Charles G. Perkins. Several months since Mr. William B. Whiting, of this city, and Mr. William Lachlan, an English engineer, arrived in this city from England, bringing with them a number of the Faure accumulators, with the view of making experiments and establishing branches throughout this country of "La Lumière et La Force," which company at that time had exclusive control of all the inventions of Mr. Faure. The purchase then of the exclusive right to use Faure's inventions in the United States led to the formation of the company here considered. It is understood that the storage batteries are to be used principally for lighting private houses, theatres or the streets. The company, however, feel fully competent to provide the power necessary to run street railroad cars and smaller appliances, and, considering the many advantages offered by the use of the accumulators, it is but reasonable to expect that the public will soon recognize their superiority over many other forms of applying electricity.—*Iron Age.*

The Submarine Use of Dynamite. — *La Nature* (Paris, November 11) gives an article by M. Maxime Hélène, on submarine explosions of dynamite, in which he describes and illustrates the blowing up of a rock at the mouth of the river Adour, conducted by himself. Four charges of 22 pounds each were placed on the rock (which was under water) at distances of about 6 feet on the same level. The charges were placed by a diver, the operator in a boat above retaining the wires connected with each charge. When the diver had reascended the wires were all connected to two conducting wires, and the boat rowed away, carrying the latter with it. At a distance of over 300 feet from the rock, these were put in connection with the battery, the circuit closed, and the charges exploded. Although the arrangements are simple, the operation is a very delicate one; and the difficulty of effecting a perfect connection of the various wires with other obstacles, will often make it a tedious one. If not very carefully conducted, it is also dangerous, as was proved by the fatal result of a similar operation carried out at Antwerp a few days after M. Hélène's successful one, in which four lives were lost.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL XII. Copyright, 1882, JAMES R. OSGOOD & Co., Boston, Mass. NO. 365.

DECEMBER 23, 1882.

Entered at the Post-Office at Boston as second-class matter.

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OUR subscribers and others will be good enough to recollect that the reduced subscription-price that at present obtains remains in force only until January 1. On and after that day the regular rate will be reëstablished. We desire to say, also, that it is extremely unlikely that the circumstances which led us to make a concession this year will repeat themselves next, and we hope that no subscriber will next year present the unavailing plea that as he took advantage of the reduced rate this year he should be accorded the same favor ever after.

THE project for the construction of a new building in Washington for the National Library has been set aside for the present by the refusal of Congress to consider a bill for the purchase of the land necessary for a site. Although the plans of the building have been prepared, and Mr. Smithmeyer, the architect, has been sent abroad by the Government to make some final studies of libraries in Europe, it is said that a prejudice exists in the House of Representatives in regard to the scheme, and particularly, that the owners of the tract opposite the foot of the Capitol, who are anxious to sell their land at a high price, have given offence by their pertinacious efforts to influence members in its behalf, so that a final determination has been arrived at to leave the Library where it is,—in the Capitol. In this place, however, it is in constant danger from fire, and as its destruction in this way would probably involve that of the Capitol itself, the only prudent course is to remove it at the earliest possible moment to a place of safety. That the Capitol hill is the most suitable place for it, no one, we imagine, can deny, and while it is desirable to avoid any unnecessary outlay in the purchase of the site, it is very unlikely that land in the centre of the rapidly growing city of Washington will ever be cheaper than now, while the adoption of a location on any part of the limited territory now belonging to the Government would simply mean the placing of a very important building on a poor site, with the consequent necessity for the future purchase of a costly site for some poor building.

THE *Spectator* comments on the great fire in London early in this month, which destroyed sixteen million dollars worth of property, and mentions that it was the first extensive conflagration which has occurred in the city since Captain Shaw was placed in charge of the Fire Brigade; his predecessor, Captain Braidwood, having lost his life by the fall of a wall in the great Tooley-Street fire, which was, until now, the last one of special importance. The first building burned in the succession of conflagrations which caused the present immense loss was the Alhambra Theatre, a high structure in which the flames could be reached only with difficulty. Twenty-five engines were employed all night at this place, and when some warehouses not far off took fire, there was not sufficient force at hand to deal with them. The first of these was occupied by a firm of dealers in hosiery, and the narrowness of the street in which it was situated did much to impede the efforts of the firemen. After this and the adjoining buildings had been nearly consumed, the flames spread into the next street, seizing first upon a large building filled with millinery goods, and extending to others, until a considerable district was involved. Fortunately, the conflagration was checked just before it reached the great retail shops on Cheapside and in the vicinity of St. Paul's Cathedral, on one side, and the Post-Office, the Bank of England, the Royal Exchange and the private banking houses of Bishopsgate and Lombard Streets on the other. The *Spectator* thinks that this event will lead to a change in certain details of the methods of fire extinction which Captain Shaw has adopted and defends so earnestly; and that his experience will convince him that the half-inch streams of water thrown from the hand-engines of the London Brigade might be advantageously replaced under such circumstances by the solid two-inch streams which our steam fire-engines deliver.

THERE is something surprising in the frequency of fires in great English mansions within a few weeks past. The ashes of Clevedon and Ingestre were hardly cold when Hampton Court was seized upon by the flames and seriously injured, and a day or two after Winnington Hall, in Yorkshire, was totally destroyed in the same way, followed immediately by another lordly seat in the West of England. The theory usually brought forward to account for these conflagrations explains them on the ground that new heating appliances have been recently introduced, and the setting has been so done as to expose the old wood-work to undue heat. This hypothesis would seem to indicate a degree of carelessness on the part of English heating engineers which we hope cannot justly be attributed to them, and we shall look for more reasonable explanations before long. It is true that the burning of Ingestre is said to have been caused by the kindling of a floor-beam upon which the hearth of one of the fireplaces was laid; but this was a portion of the original construction, and the similar cases, in which the timbers have resisted the heat of the fires of three hundred winters, to succumb to the radiation from a basket of cannel coal, must be few indeed. It is perhaps possible that oak, seasoned by the lapse of centuries, may be more liable to take fire from, for instance, the heat of a steam-pipe, than newer wood, and it may also be possible that the English engineers, like the French ones whose carelessness caused two or three fires in the Louvre last winter, may not understand the danger of placing steam or hot-air pipes in contact with wood; but a few such lessons ought to be enough to teach them wisdom.

THE loss at Hampton Court was not very important. Some twelve rooms were burned, most of which contained pictures and other works of art, but none of great value. The tapestries representing the life of Alexander the Great, from cartoons by Le Brun, were damaged by water, and a ceiling of the last century, painted by Sir James Thornhill, was ruined; but the precious pictures of Velasquez, Mantegna and Vandyck, with the less valuable but equally famous ones of Lely and Kneller, were saved. The cartoons of Raphael, which were for so many years identified with Hampton Court, where a special gallery was built for their reception, were removed some years ago to the South Kensington Museum for a temporary purpose, and have since remained there. The building itself seems not to have been seriously damaged, and the cost of making good the losses will hardly exceed thirty thousand pounds.

THE career of the elevated railway companies in New York has been marked, in many instances, by an appearance of impudent trickery which has permanently injured their credit among honorable persons, and certainly tends very much to obscure the memory of the great material advantage which the city has derived from their construction. The latest evidence which has been offered of the desire of the corporations to avoid their just obligations is contained in a letter to the Mayor of New York from the Vice-President of one of them, referring to the recent decision of the Court of Appeals, in favor of the claim of Mr. Rufus Story for compensation for the obstruction of the street in front of his place of business by the railway tracks, and notifying the Mayor that, inasmuch as a certain compensation was paid by the companies for the right to build

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tracks in the streets, a virtual contract was made by which the city must assume the payment of all damages which might be recovered by any person on account of injuries received from obstructions so caused. This extraordinary inference from the permissive act by which, notwithstanding violent opposition, the elevated railways were allowed to take for their own purposes a considerable portion of the streets which the city had built and paid for is to be sustained by the corporations in the courts. No doubt great efforts will be made to establish it, as the same reasoning, if it should prevail, would saddle upon the citizens not only the cost of the injuries which the elevated roads might inflict, but also those caused by the steam and hot-water pipes which are now, or will be, laid under similar concessions.

The commission which has charge of the national monument to King Victor Emmanuel of Italy, finding none of the plans submitted in the last great competition quite satisfactory, has opened a new one, for which a year of preparation is given, the designs not being received until December 1, 1883. Some modifications are made in the first programme, the site being now definitely fixed on the Capitoline Hill, upon the ground now occupied by the barracks of the municipal guards and the residence of the general of the Capuchins. The total height of the monument is restricted to twenty-nine metres, and an equestrian statue of the late king is to form the most important portion. Considering the magnificent dimensions contemplated in most of the designs of the previous competition, these very modest requirements are a little surprising, and it certainly seems as if the Italians had concluded that sixteen hundred thousand dollars was too much to devote to a dead man's memory; but the new plan contemplates the extension of the Corso to the foot of the Capitoline Hill, and the construction of a grand staircase leading upward to the monument, so that the cost of the whole project will at least be very considerable. What, if any, may be the stipulations as to the cost of the work and the premiums offered we do not learn, or whether the competition is to be confined to Italians, as was once proposed.

The thirteenth of December was the day assigned for the disclosure to the stock-holders of the Keely Motor Company of the patentable character of the device upon which their money has been so liberally spent; and a meeting was called to receive the important information. As usual, the proceedings were of the most satisfactory character, and the participants separated with glowing anticipations of the prospects of the great invention, concerning the exact nature of which every one except Mr. Keely and Mr. Boekel seems to be as much in the dark as ever. It is, however, gratifying to know that "a caveat for the generator has been prepared and forwarded to the Patent Office;" and Mr. Keely assures his constituents that he "has passed the line of experiment," and "nothing is left to be done but the completion of mechanical work now in progress upon the engine." After this "mechanical work" is finished, which we trust will be soon, it is the intention of the great inventor to "bring the engine to the attention of the Pennsylvania Railroad Company," with a view to having it tested in hauling trains between Philadelphia and New York. Mr. Boekel seems to have been in as good spirits as his principal, and presented an independent report, in which he said that Mr. Keely's investigations had carried him "far beyond the experiments of such men as Professor Tyndall" and others, and he had "succeeded in exciting, harnessing and utilizing the subtle force which to them has been only a subject of scientific wonder." We hope some one will write at once to Professor Tyndall and ask what the subtle force is which has been to him a subject of scientific wonder, as there seems to be no other way of finding out, and our curiosity will not brook much further disappointment. It is remarkable that nothing was said at the meeting about further supplies of money for "harnessing" that invisible force which Mr. Keely seems to find so unruly, but there will be plenty of time for that before the caveat expires.

About two years ago Mr. Dawson, a lawyer of New York, who was living at the time in an apartment-house on Broadway, in going to his rooms at night fell through the open door of the elevator-shaft, receiving injuries which kept him to his room for three months. In addition to the suffering caused by the accident, he acquired, by the influence of the morphine prescribed him for relieving his pain, a craving for the drug, which he was only able to overcome after six weeks of distressing effort. Although he was ultimately cured, his experiences left him so weak, and with nerves so shattered, that it was a year before he could resume his business, and by that time most of his clients had employed other professional advisers, so that his income fell off from about ten thousand dollars a year to almost nothing, while he was left with bills to pay for medical attendance. Under these circumstances he felt that compensation was due him from the one whose carelessness led to his misfortune, and he has now brought suit against Mr. Sloane, the owner of the building, to recover one hundred thousand dollars, which he thinks no more than a fair equivalent for the injury he has suffered. In reply to this claim, Mr. Sloane asserts that all Mr. Dawson's troubles have been the result of his own negligence in walking through an open door into the elevator-shaft, and that he cannot be responsible for the mishaps of those who do not look to see where they are going; a principle which, whatever the jury may think of its correctness, we hope will not be allowed to receive too wide an application.

A new enterprise is projected in Lancashire for the relief of the manufacturers of Manchester and other towns in the neighborhood, who consider themselves hardly used by the railways, particularly those connecting the sea at Liverpool with the manufacturing district. It is said that now, with all the facilities which modern railway management ought to be able to give, the cost of transporting freight between Liverpool and Manchester is actually greater than it was sixty years ago, before railways were thought of; and that, moreover, the speed of transportation is little, if at all increased. To the extortionate charges of the railways have to be added the cost and depreciation involved in repeated handling and transhipment between the hold of the vessel which brings raw cotton, or takes away goods, and the mill-yards, so that in many respects the change from cartage by horse-power to railway carriage has been a positive inconvenience. To remedy these troubles a Liverpool engineer, Mr. Alfred Holt, proposes to lay out through the Manchester district a system of "plate-ways," or roads furnished with a double row of iron plates, spaced so as to afford a smooth track for ordinary drays and heavy wagons, which can be drawn either by horse-power or by a traction engine. Such wagons will pass readily from the ordinary road to the plate-way, and it is intended to arrange the traffic in such a manner that cases of cloth will be loaded into them at the mills, drawn to the nearest station, taken up by the trains which pass at stated intervals, and transported to Liverpool, there to be disconnected, and drawn by a second set of horses to their destination. After unloading, they will be sent to the proper pier to receive bales of raw cotton as return freight, which will be transported in the same way back to the mill-yards. The system has some analogy with that once adopted in many ill-paved towns, of laying a double row of smooth flags among the rough cobble-stones, at the proper gauge for wheels to run on; and the first intention of the projector was to use the public highways in a similar manner; but experiment showed that some device was needed for keeping the wheels on the track, and the plates are therefore to be furnished with raised flanges, which answer their purpose, but necessitate the construction of a line quite independent of the streets.

An attempt is to be made at Wheeling, West Virginia, to introduce the manufacture of nails made of Bessemer steel instead of the ordinary wrought-iron. It is obvious that a steel nail is, weight for weight, stronger and more serviceable than one of iron, but the cost of the plant required for Bessemer steel-making is so great that only the richest corporations can undertake it. At Wheeling, however, which is perhaps the centre of the nail manufacture, the subject is regarded as of so much importance that an association has been formed to raise the necessary capital and construct works expressly for the production of steel nail-plate, which will be delivered to the nail manufacturers represented in the association in an agreed proportion. One of the incidental results of this change in the business will be the throwing out of employment of a large number of puddlers, whose services in reducing cast to wrought iron for nails will be no longer necessary. Whether this is an advantage or not in all respects may be doubtful, but the manufacturers will be much more independent of their employés by the substitution of machinery for skilled labor in this part of the work.

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WATER-CLOSETS.[1] — II.

S. S. HELLYER gives a cut of a water-closet taken from Osterly House, which he considers a type of the closets used in England one hundred to one hundred and fifty years ago. Describing it he says:[2] "A niche in a fair-sized room was formed to receive the marble closet-pan [bowl], and a door shutting up close to the seat hid the whole arrangement from sight. A lead soil-pipe was connected with the outlet-plug (plunger) waste of the pan, and continued from it to the drain, which was brought into the house to receive it. The soil-pipe had no ventilation." (Fig. 14.)

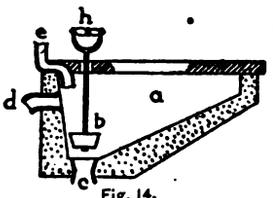

Fig. 14.
a, Bowl. *b*, Plunger. *c*, Waste. *d*, Overflow. *e*, Supply. *h*, Handle.

A. J. Roubo describes a water-closet, and also gives several views to illustrate the subject in the great French book on joiners' work (L'Art Menuisier), published in 1770.[3] We think these are the earliest illustrations of a water-closet extant. The bowl is cut from a single block of stone, all the inside lines being curves so it will not retain the filth as readily, and be easier to clean than if it were in another shape. The lead supply-pipe has T-shaped handles and a nozzle spread into the form of a fan, which is evidently for the purpose of spreading the water over a larger surface of the bowl than would be the case if the nozzle was of the same shape as the pipe. The above-mentioned closet is one of the simplest forms of plunger-closets, and if we are determined to use a closet of this class, then the simpler style would be better and more cleanly than those which have concealed and foul compartments in which the plunger works, and of which only experts have cognizance. In this closet we see a branch from the supply-pipe which could have been used only as a bidet-attachment. This has a hinge-joint so it can be folded back under the seat when not in use. The wood-work is carefully mitred, being tongued and grooved wherever it is advantageous, as is shown by the details. A lid covers the seat, and is made so it will fit as nearly air-tight as possible when it is closed. The closet described was called "a closet with a plug" (*Lieux de soupapes*), and it was in use in France a long time before it was in England, as the author informs us.

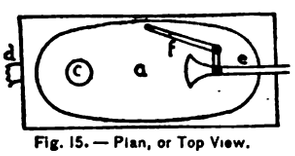

Fig. 15. — Plan, or Top View.
a, Bowl. *c*, Waste with plunger removed. *e*, Supply. *f*, Bidet-attachment. *d*, Overflow.

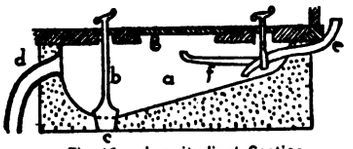

Fig. 16. — Longitudinal Section.
a, *c*, *d*, *e*, *f*, Same as Fig. 15. *b*, Plunger. *g*, Seat-cover.

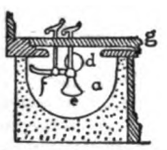

Fig. 17. — Cross-Section.
Letters same as above.

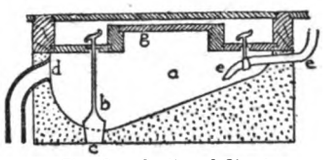

Fig. 18. — Section of Closet.
Without bidet-attachment and different arrangement of seat. Letters same as Fig. 16.

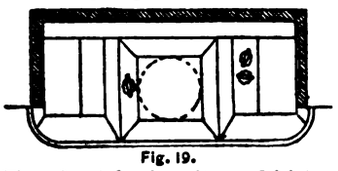

Fig. 19.
View of seat showing mitres and joints.

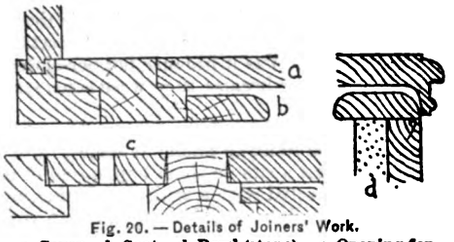

Fig. 20. — Details of Joiners' Work.
a, Cover. *b*, Seat. *d*, Bowl (stone). *c*, Opening for plunger and cock handles.

The first English patent[4] for a water-closet was issued in 1775, A. D., to Alexander Cummings, a watch-maker in Bond Street. This closet has a sliding valve, or slider, as it is called, between the trap and bowl, and is the only patent issued with a horizontal sliding valve. The title being "a water-closet upon a new construction," proves the use, we might say the common use, of water-closets during and before this time, but of a different pattern from Cummings's closet. Here we find the first recorded instance of a siphon trap being used under and in connection with a water-closet, although we have evidence of siphons having been used in the time of the Egyptians. Below are quoted a few extracts from Cummings's specifications: "The advantages of the said water-closet depend upon the shape of the pan or bason [bowl], the manner of admitting water into it [near the bottom], and on having the stink-trap hitherto used for water-closets so constructed that its contents shall or may be totally emptied every time the closet is used. . . . The stink-trap hitherto used for water is too well known to require a description here; and although it may serve effectually to cut off all communication of smell from the drains, pipe and cesspool, it becomes in itself a magazine of fetid matter, which emits an offensive smell every time that it is disturbed by using the closet. In this water-closet the pipe which carries off the soil and water is recurved about twelve or eighteen inches below the pan or bason [bowl] so as constantly to retain a quantity of water sufficient to cut off all communication of smell from below, and this stagnated water in the recurved part of the pipe is totally emptied and succeeded by fresh every time the pan or bason is emptied. . . . . The horizontal sections are circular, or nearly so." The mechanism is very clearly shown in the drawing which accompanies the specification. If the siphon-trap fulfils the duties specified, and we think it does, why complicate matters with the "slider"?

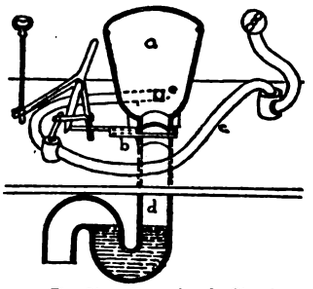

Fig. 21. — Cummings's Closet.
a, Bowl. *b*, Slider, or valve. *d*, Siphon-trap.

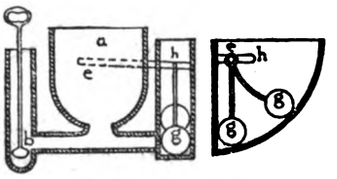

Fig. 22. — Prosser's Closet.
a, Bowl. *b*, Plunger. *h*, Chamber for ball-cock. *g*, Balls for cock. *e*, Supply.

The next patent[5] was issued in 1777 to Samuel Prosser, a plumber living in the parish of Martin-in-the-fields, for a plunger-closet with a double-ball-cock for shutting off the water when it had risen to a certain height in the bowl, and for turning on the water-supply when it had fallen below a definite point. Here we see, for the first time, the (as we consider it) pernicious practice of placing the plunger and ball-cocks in compartments separated from the bowl, as far as the sight can penetrate, but connected as far as the deposits from the water and filth are concerned. This closet is described in the specifications as "a water-closet upon an entirely new construction, which will always remain free from any offensive smell." We, at the present time, know too well the folly of such claims. Wherever concealed chambers exist connected directly with the bowl, there filth and decayed matter will accumulate, and will become not only offensive to our olfactory nerves, but hurtful to our health. The excreta, in finely divided particles, in this and all similar cases, has free access to compartments that can never be cleaned without the assistance of an expert mechanic.

In 1778 Joseph Bramah had a patent[6] issued to him for a water-closet with a valve at the bottom of the bowl, working on a hinge. This valve was for the purpose of cutting off all connection with the soil-pipe (Figs. 23, 24). It will be seen at a glance, that this closet was the forerunner of a large number of inventions, differing more or less from the original, of which the parent is certainly equal to, if not superior to, any of its offspring. All valve-closets with a horizontal valve working on a hinge, and the numerous patterns of pan-closets, are an outgrowth from the Bramah. The valve works in a

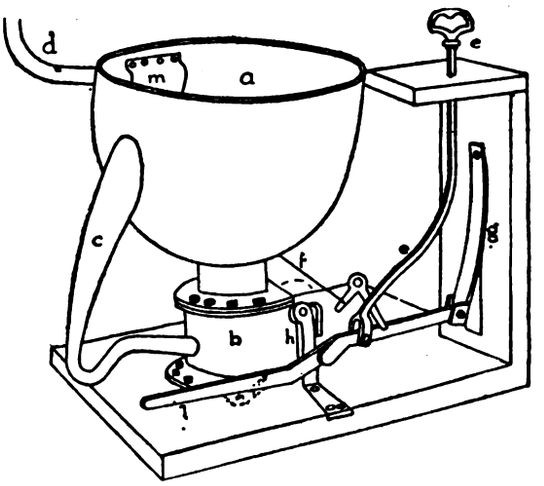

Fig. 23. — Bramah Closet.
a, Bowl. *b*, Valve-box. *c*, Overflow. *d*, Supply. *e*, Handle and pull-rod. *f*, Wire to tank. *g*, Spring. *h*, Valve-crank. *i*, Lever. *m*, Fan.

[1] A paper by Mr. Glenn Brown, architect, read at the Sixteenth Annual Convention of the American Institute of Architects, held at Cincinnati, October 26-27, 1882.
[2] *Sanitary Plumbing*. 1882.
[3] *L'Art Menuisier*, page 203, plate 69, Vol. II. 1770.
[4] *British Patent-Reports*, Vol. XIV, No. 1105.
[5] *British Patent-Reports*, Vol. XV, No. 1160.
[6] *British Patent-Reports*, Vol. XV, No. 1177.

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small chamber not much larger than the pipe. The mechanism is comparatively simple, and it has a simple U-trap as an overflow. We also note the flap or fan placed over the supply-pipe for spreading the water over the bowl. We quote the following from the specifications: "In this closet two valves are simultaneously acted

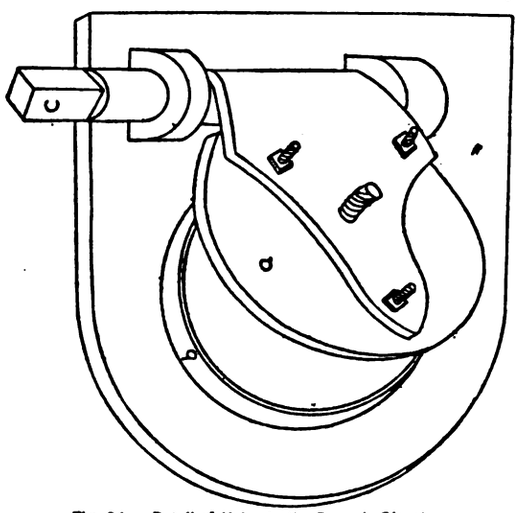
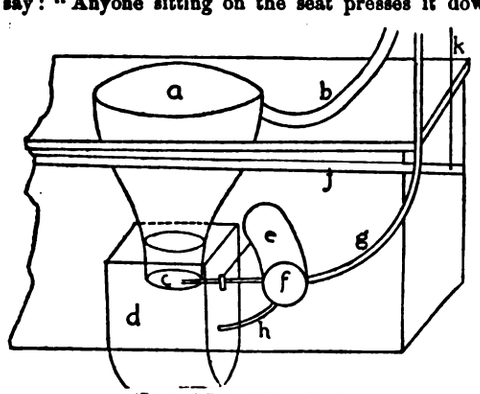


Fig. 24. — Detail of Valve in the Bramah Closet.
a, Valve. *b*, Valve-seat. *c*, Place for crank. *d*, Hinge.

on by the handle. The one valve is placed under the bottom of the basin [bowl] and when closed retains any water that may be therein, thus cutting off all smell that may be therein. It moves on a horizontal axis, and in such a direction that its surface is the more thoroughly washed every time the contents of the basin is discharged, both by the water falling upon it whilst opening, and by its meeting the water when shutting to again. The other valve is placed in the service-box, or the top part of the feeding-pipe; this valve opens and shuts in a similar manner, always meeting the natural currency of the water, when shutting, and falls from it when opening, and is not liable at any time to have its motion obstructed by the frost, no part of it being immersed in the water. Its movement is communicated through a lead-pipe or tube, soldered into the part where it acts, and is continued above the highest surface of the water in the reservoir." From the drawings it would appear that the bowls of the last three water-closets mentioned were made of lead, although there is no statement to that effect in the specifications.

Patents were issued to James Grease, 1782; David Riz, 1783; and Thomas Roundtree, 1789, for improvements on commodes.

In 1792 a patent was issued to John Ashley[1] for "a New Invented Self-Acting Water-Closet (Fig. 25), which constantly keeps itself sweet and clean and is upon a more simple construction than any heretofore discovered." This is a valve-closet supplied by a tank, the hopper being flushed by pressure on the seat. The specifications say: "Anyone sitting on the seat presses it down about an inch, which presses on the beam, and opens the sucker in the upper part of double cistern and lets the water in, and when the person rises off the seat the upper sucker closes and opens the lower sucker and lets the water down the two pipes; the one washes the bason [bowl] while the other fills the cod-piece and causes the air-ball to rise, the closer [valve] falls and lets out soil and water into said stink-trap, and by means of the small pipe the cod-piece is emptied of the water, the ball falls and raises the closer [valve] and prevents the effluvia ascending."



(Copy of Patent Drawing.)
Fig. 25. — Ashley's Water-Closet.
a, Bowl. *b*, Supply to bowl. *c*, Valve. *d*, Stink-trap. *e*, Cod-piece. *f*, Ball-cock. *g*, Supply to cod-piece. *h*, Waste from cod-piece. *j*, Beam. *k*, Wire to tank.

The common form of stink-trap is used under this closet, as we are told by the author, and in this way we gain as clear an insight into the form of trap used at that time as it is possible to do from such an imperfect drawing. It was probably something like our D-traps.

A patent[2] was issued to Thomas Binn, carpenter, 1793, for a valve water-closet (Fig. 26). It is very much like the Bramah closet, with the exception of the way the levers are arranged in connection with a complicated tank for the purpose of flushing the closet. Binn received a patent for an improvement on his closet in 1799. The improvement consisted in joining a bidet-pan to the bowl of the closet.

William Laws received a patent[3] in 1796 for an improved water-closet. He shows us a receiver and a top view of a valve which he calls a pan. He does not claim novelty for either the pan or the receiver, so it is possible that there may have been pan-closets in use before the Bramah closet was invented, and therefore it may be wrong to cast the odium of their parentage upon it. The Laws closet is intended to act on the seat being relieved from pressure. The handle is patented in connection with a self-acting closet "*to put the self-acting part to rights, and may be found very useful at some time.* . . . Another accommodation is a lever conveniently situated to act by the foot. . . . . The weight on the axis of the pan turns back to a catch, that holds the pan fast to bear the water for the next action of the closet.

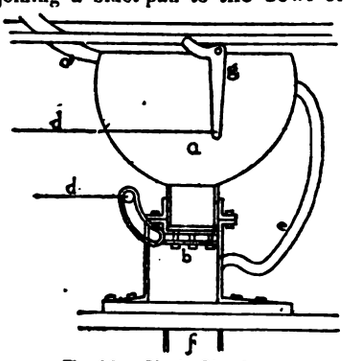


Fig. 26. — Binn's Closet,
a, Bowl. *b*, Valve. *c*, Supply. *d*, Wires to tank. *e*, Overflow. *f*, Soil-pipe. *g*, Lever, worked by seat.

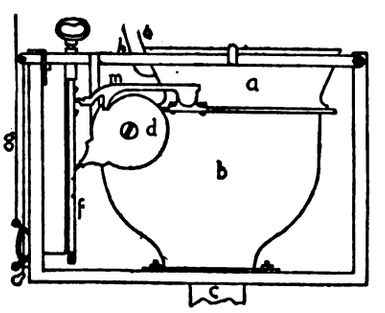


Fig. 27. — Laws's Closet.
a, Bowl. *b*, Receiver or cesspool. *c*, Soil-pipe. *d*, Ratchet. *e*, Supply. *f*, Pull-rod. *g*, Wire to tank. *m*, Catch.

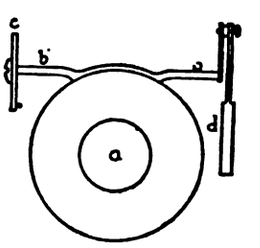


Fig. 28. — Details of Pan.
a, Pan-valve. *b*, Axes. *c*, Ratchet. *d*, Weight.

The receiver or cesspool is very much like those used on pan-closets at the present day.

French Patent Law began 1791. Between 1794 and 1800 (the date which we have assumed as the date for ancient closets to merge into modern closets) the French Government issued one patent for a water-closet to De Cœur, January 5, 1796.

There was no patent issued for water-closets in America until 1833 and 1835, and those were issues for portable water-closets or commodes.

Reviewing contemporaneous literature we find that water-closets before the nineteenth century were not considered a part of the plumbers' work. There is no mention of water-closets in "Art du Plombier," by C. M. de Gardette, an exhaustive work on the subject (1761–1779), while we find a description of the one described above in "L'Art Menuisier," by A. J. Roubo. S. S. Hellyer tells us that he could find no mention of them in the "Art of Building," published in London, 1734, or in Campbell's "Compendious View of all the Trades practised in the cities of London and Westminster," published in 1847.

A point which strikes us as curious is that we do not find mentioned or shown among the earliest closets, the simplest form or hopper-closet. Was it because hopper-closets were not in use at this early date, or because they were considered too simple to put on record?

By a careful review of the subject from 1800 to the present time, which we hope to make public at some future date, we have formed the opinion that a simple short hopper-closet is the best in use, when properly connected with a tank and flushed by water from the same (through a flushing rim), having its trap vented and its bowl ventilated in the proper manner.

The United States Light-House Service. — The extent of the light-house service is not generally known even in maritime circles. According to the latest report of the Light-House Board, we have in all 723 light-houses, 38 light-ships, 64 fog-signals operated by steam or hot air, 115 fog-bells operated by machinery, 860 beacon lights on Western rivers, 345 unlighted or day beacons, 33 automatic whistling-buoys, 14 automatic bell-buoys, and 3377 buoys of other descriptions. To maintain and attend to all these light-houses, lights and buoys requires the service of 22 steam tenders, 4 steam launches, 2 sailing tenders, 1769 light-keepers, "including laborers in charge of Western river lights," and 686 other employés, "including crews of light-ships and tenders." The total annual expense of the light-house establishment and fog-signals is $2,749,000.

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[1] *British Patent-Reports*, Vol XXIV, No. 1875.
[2] *British Patent-Reports*, Vols. XXV and XXXI. Nos. 1937, and 2352.
[3] *British Patent-Reports*, Vol. XXVII, No. 2111.
[4] *French Patent-Reports*, Vol. I, page 248.

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INSURING REAL-ESTATE TITLES.

A GREAT reform often comes unappreciated, and almost unnoted, until all rejoice in its benefits, thoughtless as to their cause. Existing crudities and incongruities continually evolve harmonious methods and organizations; and evidently by correct analysis of these products of necessity and inadequacy, and predication of their results, we may greatly expedite progress, and eventually bring our economics into perfect concord.

New movements then, demand our closest study, and one is now before us that is well worthy of it; one that has been evolved during the past six years, and seemingly ranks next the abolition of slavery.

The movement alluded to is the process of real-estate title insurance, which bids fair to remove all obstacles to the perfect organization of real property, and enable us to make this vast interest as ideal a form of property as stocks and bonds now are.

In 1876, some Philadelphia operators, thinking that transactions in real estate could be materially facilitated and increased by the medium of an exchange, organized one on the model of the familiar Stock Exchange. It was styled "The Philadelphia Real Estate Exchange." The experiment, however, was not successful, owing to the lack of three essential conditions, which were:—

1. The title of a corporate property is generally secure beyond peradventure: at present real-property titles are not.

2. Transactions in stocks and bonds require no searching of records, and no recording, as the fee is not transferred: in real-estate operations both these conditions are reversed.

3. A corporate property being generally of great bulk, and owned by numbers of widely scattered people who are each potent in its administration, frequent and accurate reports of its condition and earnings are demanded and forthcoming, and necessarily widely disseminated. On the contrary real estate being generally held in small parcels by individual owners, and intimately related to their private life, palpable reasons exist why its condition should be concealed; and hence, (except in cases of business property) a stated market-price can hardly be fixed as in the case of stocks and bonds, as personal examination before purchase is plainly necessary. The exchange organization provided no substitute.

Still this new movement was not abortive, for it evolved the present process which seems to meet the most essential requirements, and will naturally develop to answer all; and its universal adoption appears merely a question of time.

Wherein and how greatly real estate falls short of being an ideal property, the necessity for higher evolvement, the crude barbarities of the present, and the suffering entailed thereby, may be approximately shown in the following comparison of real estate with corporate property.

CONDITION OF DEPENDENTS.	
1. Of the people dependent for support upon real estate, most notably in the mechanical trades dependent upon building, a large number are underpaid; suffer severely from the inroads of machinery; have little or no work in winter; have not regular employment; frequently lose their wages, and are at best uncertain of the means of subsistence; and as these conditions leave little hope of advancement, there is not much encouragement to remain in the business: the moral tone is lowered, and the brighter minds seek more certain employment even at a much lower rate *per diem*. The estate of the remaining dependents is often pitiable, especially in times of financial disturbance. Hence result strikes, riots, and debauchery; — abnormal efforts to right the evil.	1. The employés of our corporate institutions are generally regularly employed; have no fears of loss of wages; are more stationary in habitation, more frugal in habits, more careful and contented, and generally make greater progress in manhood. Strikes are less frequent, and when they do occur, are caused not so much by any serious fault of the system, as by the inhumanity, or perhaps more correctly the *inaccessibility* of the employing class, who do not know or realize the hardships done in their name.
TRADE SERVICE.	
2. Hence, in the trades depending upon building, etc., the order of service is generally inferior. Few superior Americans can be induced to go or stay in a field offering such uncertain and scanty rewards. As a consequence, a large proportion of journeymen are foreigners. From these causes the trade is behind all others in bearing the marks of our progressive civilization.	2. The service rendered by and to corporate institutions is generally as forward as man can at present advance it, both in manual execution and directing mind. Its perfectness is the boast of our civilization.
CONDITION.	
3. As a rule, real-property investments are generally neglected, and often a disgrace to their location. No progress or improvement is apt to be made so long as any return on the original investment can be wrung from an ill-served tenantry.	3. Under the spur of an active and enlightened competition every possible advancement and economy is sought out and practised in the management of our corporate institutions to secure the maximum results with the minimum outlay.
TRANSFER.	
4. Is had at arbitrary and variable prices, generally through agents, who exact from two per cent upward for their slight services.	4. It can be had at a market price through any banker or capitalist; if personally, without charge; or through a responsible bonded agent at nominal rates.
TITLE.	
5. Titles to real estate are at best uncertain, and proved with difficulty by expensive and complicated search by trained lawyers.	5. The only risks incident to the title of a bond are forgery and false utterance, facts easily detected, and matters of general newspaper information.
CHARGE FOR SERVICE.	
6. On new investments made by long-headed operators, with due regard for the demand, returns are had of from 8 to 12 per cent, and in some instances more. On old investments, returns are a variable quantity, always in excess of a fair remuneration for services rendered, only endured by tenants because of inability to do better, and pressing hardest on those least able to bear the burden — the poor, who pay, in many cases, exorbitant prices for habitations in which a humane man would be ashamed to quarter his beasts.	6. At present, any good security sells at a rate which realizes not more than 3 to 5 per cent; and new stock of enterprises offering good evidence of such returns is eagerly sought for permanent investment.

Evidently the condition of real property and the service thereof is inferior to that of corporate property; and the returns on judicious investments in the former are very much greater than in the latter; and capital and labor would go into real property from more crowded fields were it not that, when one buys real property he must act on his own judgment, besides incurring the risk and expense of proving title, transfer, etc.: and in case he wishes to dispose of his holding, must find another of his own mind as to its value, and pay probably two per cent or more to an agent for each transaction, besides losing time, etc.: whereas he can buy stocks or bonds without risk or loss of time, at a price fixed daily by shrewd operators, and dispose of them as readily to any bank or capitalist, and if through an agent, at a nominal commission and risk.

Now people are loth to incur risk and expense, and slow to trust their own unaided judgment, especially in matters with which they are not wholly conversant, preferring to follow the precedent (especially when successful) of those of better opportunities for knowledge, and larger experience than they themselves possess; and hence so long as these relative conditions of the two forms of property exist, they will continue to neglect property right under their own eyes, offering absolute control and eight to fifteen per cent per year, and invest in the ten-thousandth part of a property they have never seen, and run by men of whose character they have only hearsay evidence.

Thus we see that the real-property interest is neglected, languid, disorganized and barbaric in its conditions, all the result of: —

1. Insecurity of title after search and transfer, depending, as it may, on technicalities, or a judges' dyspepsia; the varying rulings of courts; the exact compliance with law in the matter of forms, etc., by each antecedent owner; the correctness in form and interpretation of wills, deeds, etc.; the honesty of irresponsible magistrates, commissioners and notaries; and liable, as it is, to be upset by the novel ruling of a new judge.

2. Faulty methods of keeping the records, necessitating vexatious and expensive searches by lawyers of great experience, whose best efforts cannot insure absolute safety.

3. Feudalism, and antiquated cumbrousness in the legal forms of transfer, wasting time, and giving many chances for quirks, quibbles, and technicalities.

4. Absence of any systematic appraisement.

5. The tardiness, expense, and uncertainty of justice when sought in our courts.

6. The absorption of large properties by small mortgages owing to increase of the standard of value, and the fact that the law gives no valid protection against the uncertainty of markets in cases of forced sales.

These conditions result in requiring in the real-estate market the greatest shrewdness and experience, and afford much room for trickery, cajolery, false representation, swindling, etc., — opportunities too often availed of, — and depreciate the general character of real-estate agents, besides rendering possible the exorbitant commissions exacted by them.

Until these conditions are changed real property offers neither inducement nor facility for temporary investments, and not much to any capitalist unless armed with experience and shrewdness, and until the field is attractive to capital, a high grade of service can hardly be expected.

It is imperative to sweep away all these evils and abuses, and place real property where it of right ought to be, in the very front

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and foremost rank of investments, thus meeting a great business need, by opening to idle and ill-requited capital a limitless and safe investment, where in return for necessary and now ill-performed service, good and increasing profits may be earned, and all the pulses of trade be made to throb with a new and healthier life; thus averting the wild speculations and the following panics that now attend flush money markets.

The title-insurance movement with its natural evolvements seems the key to the situation.

Of the enumerated disadvantages, the fifth and sixth are due to faults in our present financial and judicial systems, and present problems for future solution; they bear on all forms of property, but most severely on real estate, because of the more frequent transfer of the fee, and other operations. The fourth will be met by a bonded real-estate-exchange system that will naturally attend the title-insurance companies, creating a new avocation and keeping it in the hands of worthy men; and as these give it their daily attention, real property will have a market price fixed just as is that of stocks and bonds; for assuredly if these could only be disposed of by hawking them about, with commissions enough at both ends and in the middle to eat up one or two years' earnings, their attractiveness for investment would be just that of real property under present conditions. The first, second and third objections are met in the title-insurance organization itself; which with some slight modifications in the law will give perfect security of title, and easy and speedy transfer at low commissions.

These measures with the skilful rating of property by operators, will make realty attractive for both temporary and permanent investments, and hence, naturally improve the service and the grade of labor dependent upon it, and ameliorate the condition of the dependent laborers by giving them more regular employment at better rates; and will go very far (if not entirely successful) to make real estate an ideal property. Chauncey N. Dutton.

SUNDRY WORKING-DRAWINGS.[1]—I.

When I was asked to read a lecture to this Association I did not like to refuse, and yet I felt that I really had but little to say beyond what I have already said at one time or another in these rooms, either with regard to the general principles or the practice of the art of architecture.

It is true that a very tempting list of subjects suitable for architectural essays was kindly submitted to me by your officers, from which I might have selected a theme whereon to discourse; but I thought that the task of working up the necessary materials for such a lecture might fairly be left to some of the rising younger men in the profession, who have both more time and ambition for such a purpose than I now have.

It strück me, however, that there must be, or at least ought to be stored in the folios and memory of one who has been so long in architectural practice as I have been, drawings and incidents which, though doomed to ultimate and speedy oblivion, might be temporarily revived for the advantage of his younger brethren upon such an occasion as this.

I chose, therefore, the title of "Sundry Working-Drawings," simply as a convenient peg whereon to hang, as it were, some gossip which might suffice to occupy one of the evenings of your session. If this should prove, as I cannot but fear it will, to be of questionable taste, as partaking somewhat too much of an egotistical nature, I still venture to hope that, though it may lay me open to censure on that account, it may not be altogether a waste of your time and attention to listen to it.

Should I not have been entirely mistaken as to this idea, it is possible that my effort may serve as a hint to other architects, whose stores and reminiscences are of greater value than mine, and lead them to follow my example. Then, if such could be induced to look over the contents of their shelves, and to dip into the pages of their diaries, and extract thence for the benefit of their juniors some of the details and particulars of their professional experience of greater value for instruction than mine can pretend to have, I shall feel more than rewarded for the little trouble that the preparation of this paper has cost me.

The first impression that I received upon my addressing myself to the task I had set myself was, I confess, one of considerable depression; for I found, after searching into my portfolios, that the majority of the drawings contained in them had apparently been begun, at the commencement of the several works, perhaps rather too elaborately, in an excess of zeal, but that during the progress of the buildings pressure of time and other circumstances seemed almost always to have compelled a gradual contentment with less degrees of finish. The result was that there were in fact very few of the drawings that had ever attained the character that in theory I had aimed at, or that were in a condition fit to be exhibited.

Nevertheless, by the zealous assistance of the gentlemen in my office, I have been enabled to complete a moderate number of these working-drawings: sufficient at any rate, I hope, to convey to you the principal of the points that I wish to bring before your notice. To the editors of the several professional journals, also, I owe sincere thanks for the courteous and liberal manner in which they met my proposals that they should reproduce, on a reduced scale, some of these drawings to serve as illustrations to the reports of my lecture in their respective pages. It may also be noted that it is but recently that this could have been done to the extent and in the manner it has been, but for the great advance in the means for such reproduction that science has rendered possible.

"Working-drawings" being the nominal subject that I have now to deal with, I shall commence by making some few remarks upon their features and characteristics.

Working-drawings may be subdivided into what may be termed, for the sake of distinction, *general working-drawings* and *detail working-drawings*. The former of these are usually drawn to the scale of one-eighth of an inch to a foot, except in cases in which the buildings are very extensive, when the scale of one-sixteenth of an inch to a foot is frequently used. Neither one nor the other of these scales, however, is in my opinion the best adapted to set off to advantage a design, the detail of which is of a character at all elaborate. Then the scale of one-quarter of an inch to a foot is altogether too large for general working-drawings, and it makes the drawings quite too cumbersome in size. In my opinion the scale of three-sixteenths of an inch to a foot is the one which gives the best effect for such general drawings as it may be thought worth while to take some exceptional pains with, although it is true that it is somewhat troublesome, and is objected to by builders on account of its being unusual.

For detail working-drawings the scale of one-half inch to a foot is the one that is most suitable for brickwork and stone-work, and that of one inch to a foot for wood-work generally; but for roofs, and such like designs in wood of large size, the half-inch scale will suffice. Mouldings and the like should, however, be always drawn out full size; as it is not safe to allow workmen to enlarge them for themselves from drawings to smaller scales, there being considerable risk of the delicacy and essential features becoming more or less spoiled during the process.

The term "working-drawings" distinguishes those which are intended to direct the actual execution of the work from either probationary drawings, for which less accuracy and more artistic effect is necessary, or from drawings of executed work, such as may have to be done by students for exercise or in competition for medals and prizes. The minute and painstaking character expected in the latter cannot be maintained in ordinary actual practice.

For working-drawings, therefore, the primary essential is clearness rather than technical excellence or beauty of draughtsmanship. For this reason the representation of shadows is to be avoided in them, and I need hardly say that back-lining, once so fashionable, and which is but an affectation of proper shadowing, is quite inadmissible. Coloring to working drawings should be used simply for the purpose of distinguishing the different materials, and the same colors should always be used for the same materials. The printing and writing should be distinctly legible, though of course it is desirable that it should at the same time be somewhat characteristic.

Economy in the preparation of working-drawings is a most important point for consideration, both as regards the labor and cost, for though an architect is only supposed, according to the regulations for professional custom of the Institute of Architects, to be obliged to supply one set of drawings and one set of tracings, these fall far short of the usual demands in practice; nor is it often, according to my experience, politic, if possible, to seek or obtain additional remuneration for further copies, although fairly chargeable. My own custom in this respect is to keep my working-drawings in pencil, so that I may be able at any time to make any alterations required therein. From these pencil drawings I have tracings made, in strong black ink upon white tracing-paper, whence other copies may be taken and multiplied by means of photo-lithography. I am thus enabled, at a comparatively small expense, to supply as many sets of the working drawings as may be called for by employers, surveyors, builders, or societies. By the same means, also, especially in the case of old buildings destroyed, restored, or altered, the folios of the Institute and this Association may and should be enriched.

You are aware that it is upon the character of his working-drawings, rather than upon that of his preliminary sketches, valuable as an able and artistic treatment of those undoubtedly is, that the ultimate reputation of an architect depends. It is these only that actually affect the work itself. Upon the clearness and accuracy of the working-drawings alone do the employer's interests and immunity from disputes and extra charges depend, so that they require, and should receive, all the care and attention that can be bestowed upon them. Doubtless, therefore, you have often determined that, come what will, these at least should have your own personal work, and that they should represent you, as it were, and all that is in you, and that their study and completion should precede the execution of the contract. But, alas! man proposes, but fate and circumstances too often dispose otherwise, and you frequently find to your disappointment and regret that after complete and elaborate sets of both general and detail working-drawings have been prepared, it has proved that it has only been to be set aside in consequence of some change of purpose, with or without reason, on the part of your employers, and then that the whole work has to be done over again. You thus get to learn by experience that circumstances compel some compromise between the perfection of working-drawings that you would yourself desire, and such comparative imperfection as may just suffice to secure the work being properly carried out. This it need hardly be said will not reach that standard of excellence which

[1] By J. P. Seddon. Paper read at the meeting of the Architectural Association, November 24, 1882.

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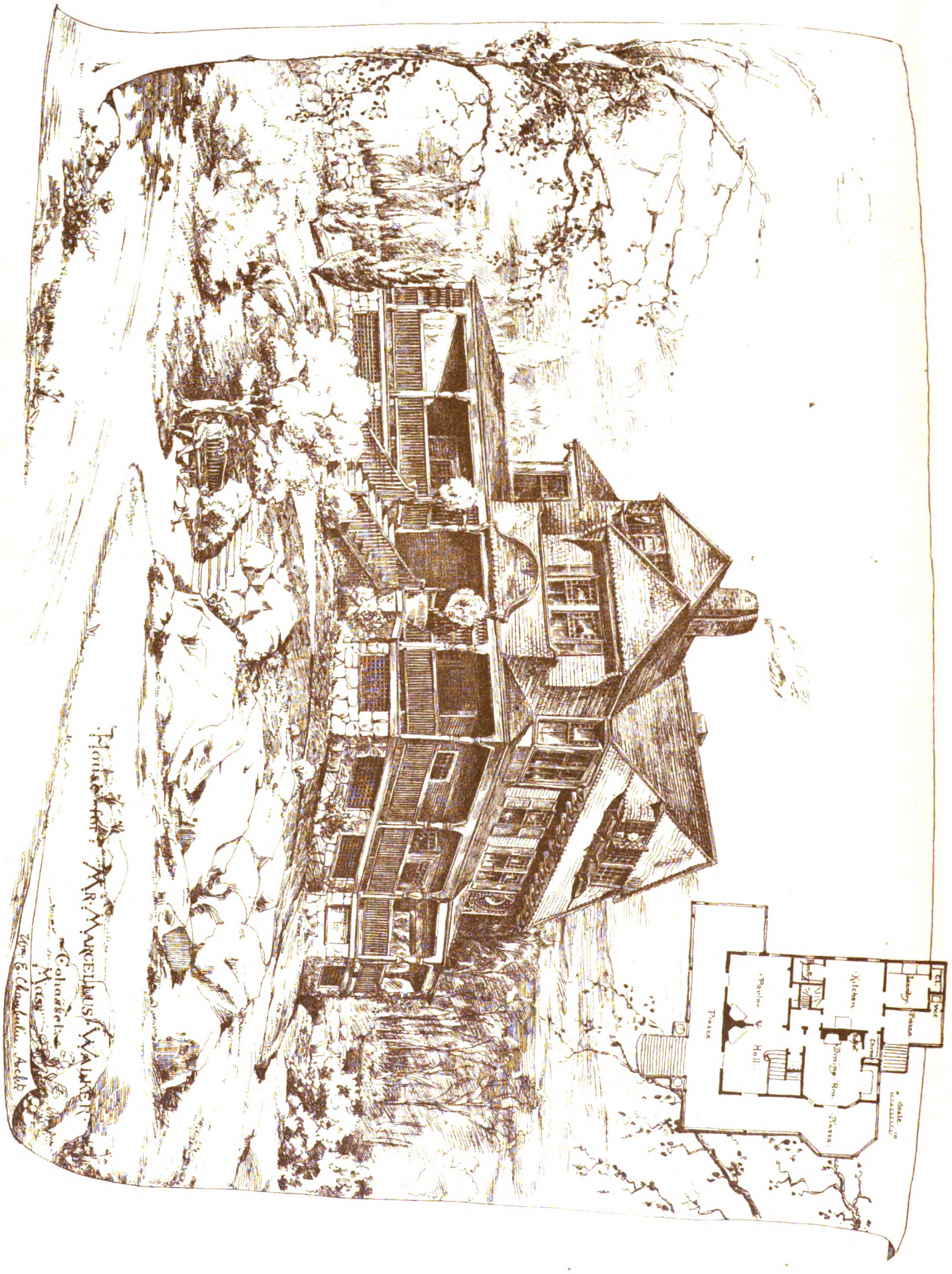

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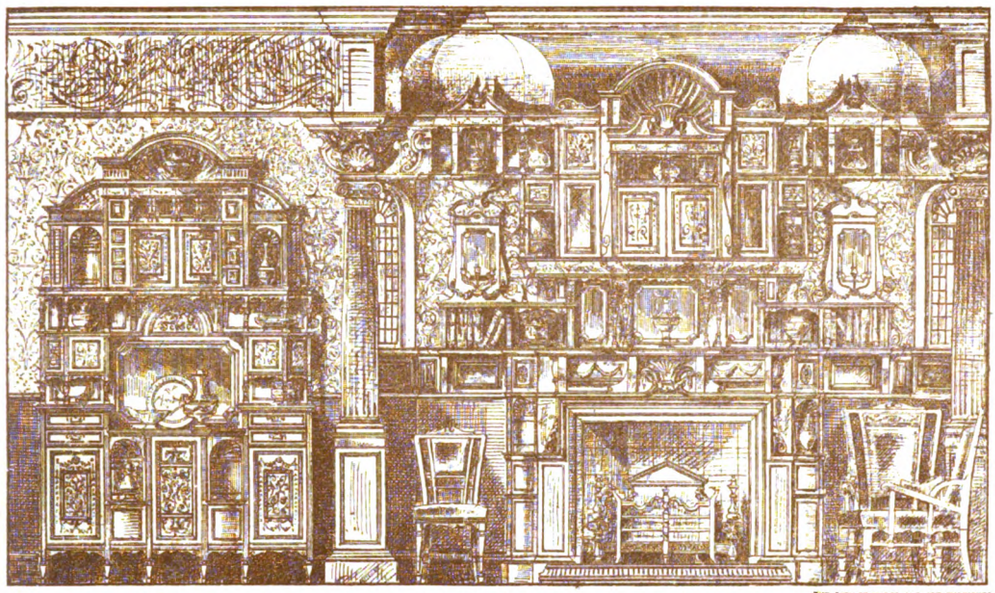
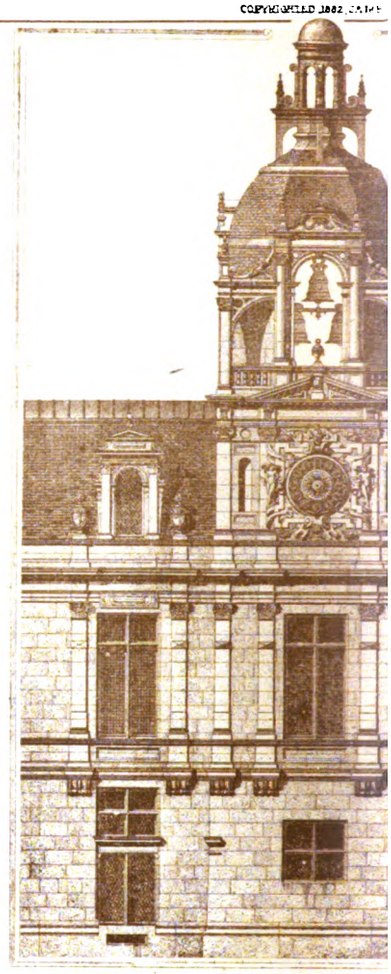


THE CABINET MAKER AND ART FURNISHER.

FIRST PRIZE DESIGN.—Side of Drawing Room, by C. Porter, Bath.



PAVILLS. D'HÔTEL DE VILLE. — Fol.

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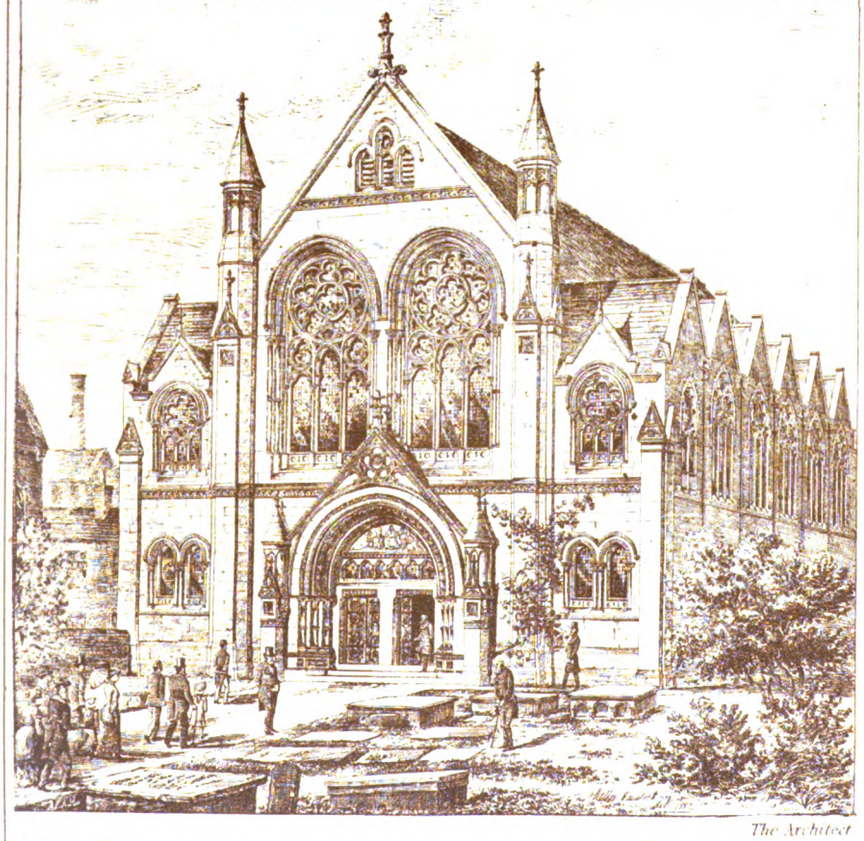

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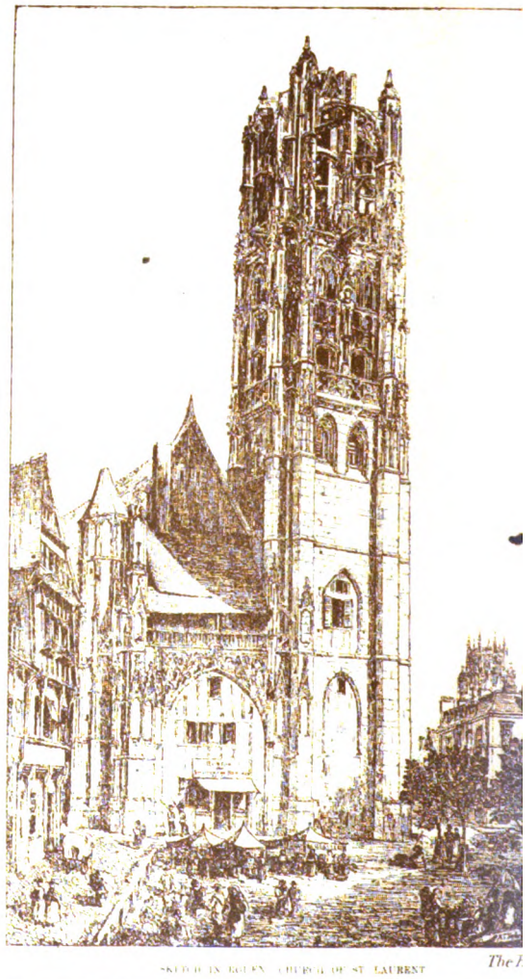

SKETCH IN CAEN. CHURCH OF ST. LAURENT.

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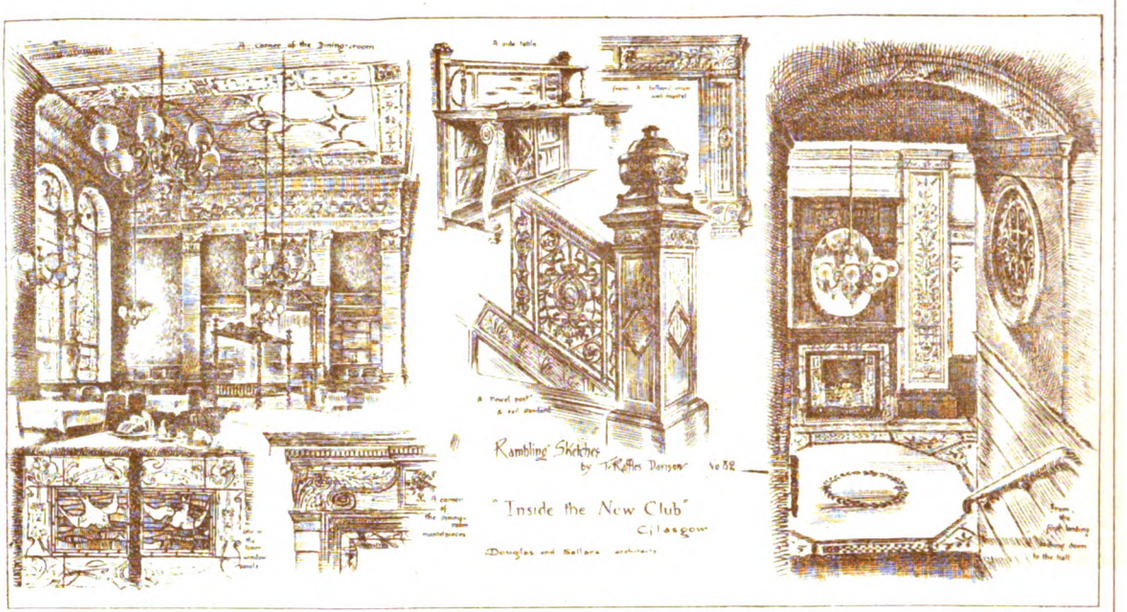
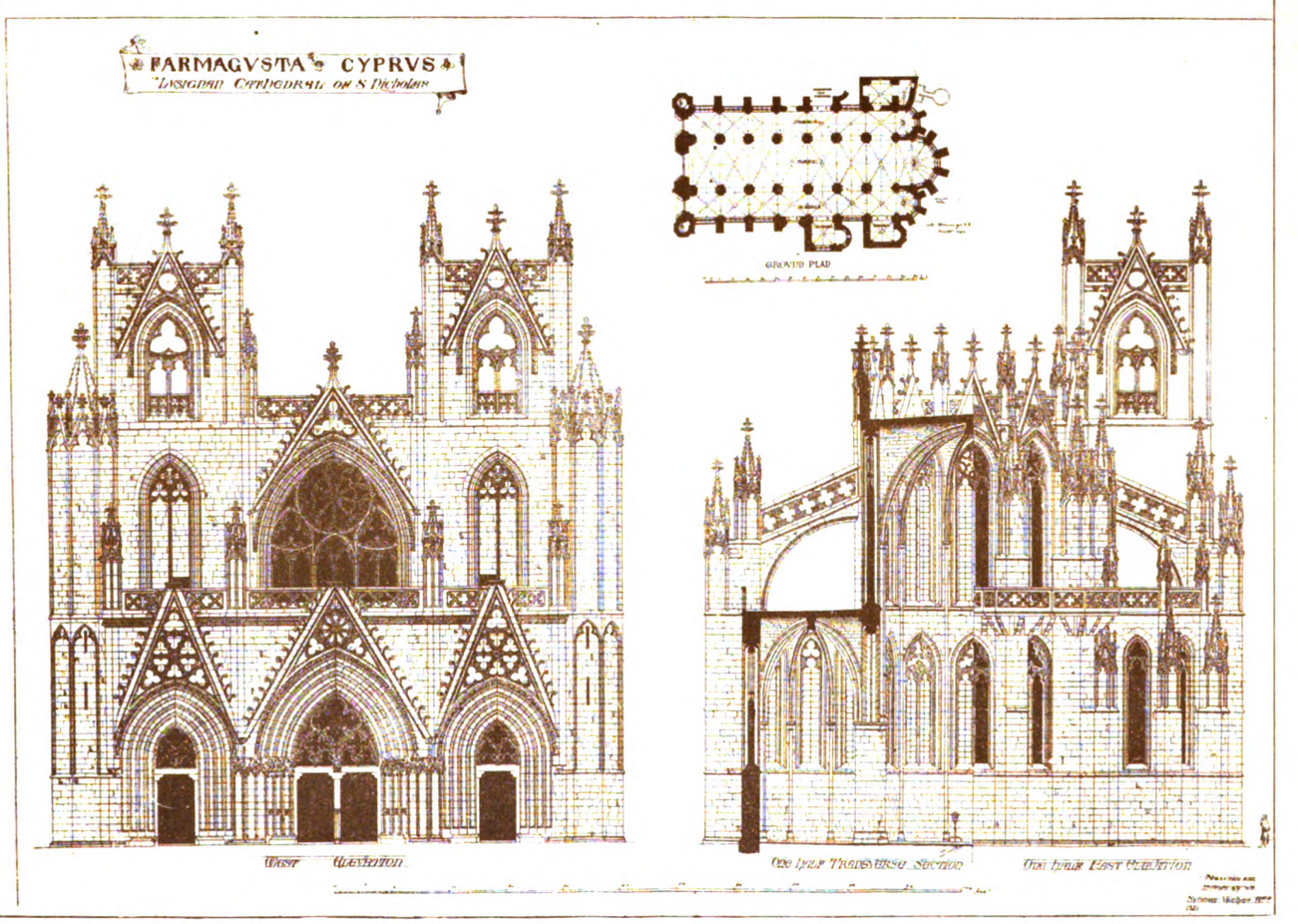


OUR FOREIGN EXCHANGES, XI.



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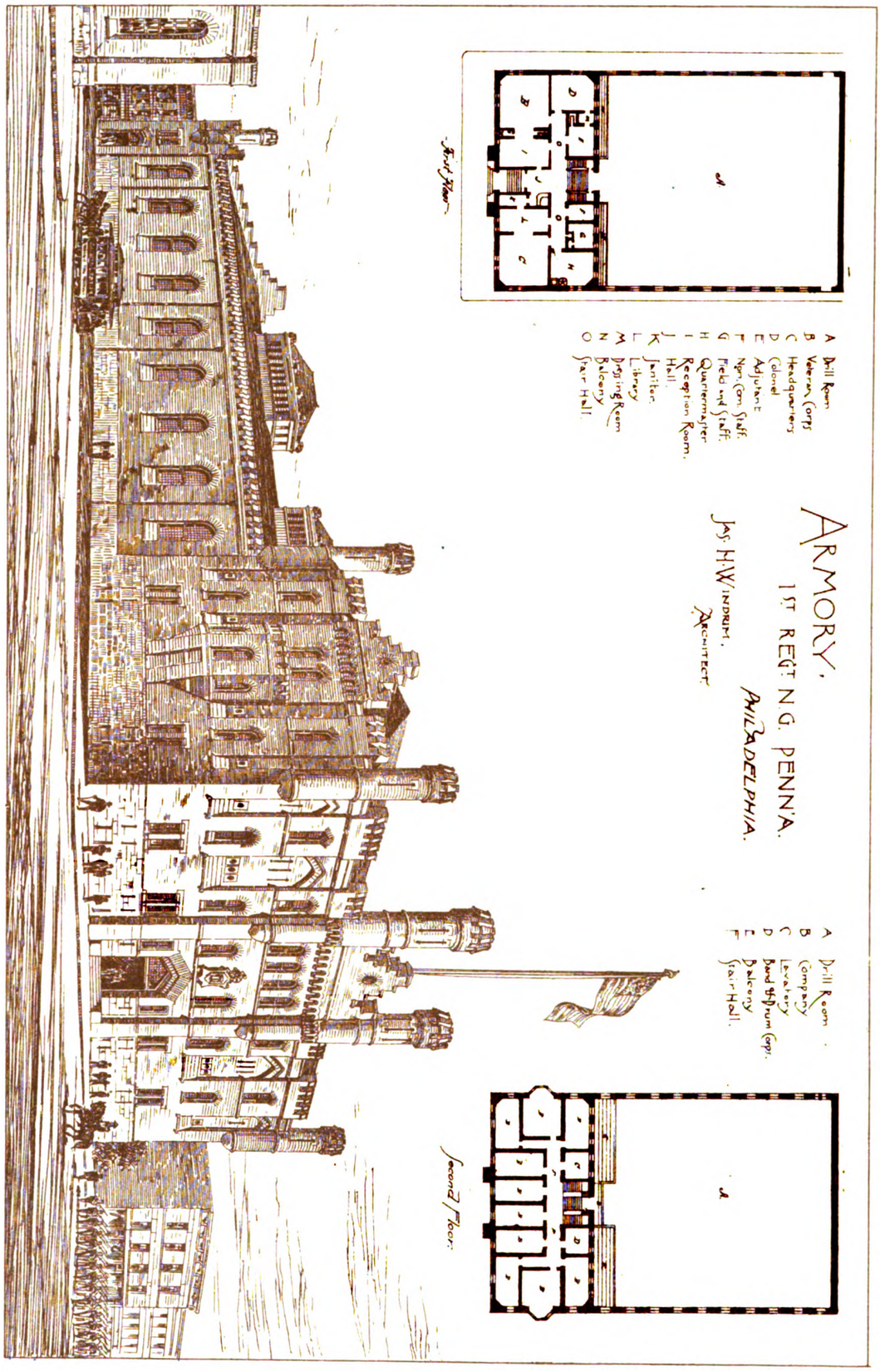

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Puerta de doce Cantos, Toledo, Spain.

(Gateway of the Twelve Pebble-Stones.)

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is so often attained by the student competitors for the medals and prizes of the Institute and this Association.

Sometimes, instead of letting the preparation of the detail working-drawings follow that of the general ones, so as to be simply explanatory thereof, I reverse the process, making my designs at once, after mere preliminary sketches, to the scale of a half-inch to a foot. This plan reduces the working-out of the smaller-scale general drawings completely to a mere mechanical operation, so that it can be done without any personal supervision on my part, and yet with certainty that the character intended for the detail will be preserved throughout. By this means my own time and attention is able to be concentrated upon those parts of the work which alone demand thought and design; the rest being left to be done entirely by others. I was able by this means, in the case of the competition for the Law Courts, to dispense with any increase of my staff, and not to disarrange at all my ordinary practice; whereas I remember to have heard almost all my competitors complain of having suffered severely in both those respects.

It is time now to descend from generalities and to speak of particulars, and I think that the most convenient way of arranging the matters I propose to bring before you will be in what may be termed brief, isolated, autobiographical passages, placed in chronological order, which will admit of occasional divergence as subjects appear to suggest themselves. My excuse for these must be that in reality an architect's life is represented in his works, and his works constitute all that in his life is worth any record at all.

Most of my early professional experience was obtained in the diocese of Llandaff, in connection with its diocesan work. In the year 1851, the period of my apprenticeship to Professor Donaldson having expired, I spent three months in a rapid sketching tour upon the Continent, in companionship with the late Mr. Thomas Hill. Immediately after my return I was fortunate enough to receive a commission to build a hotel at Southerndown, a small watering-place on the coast of South Wales, near Bridgend in Glamorganshire. After my first visit to that neighborhood to inspect the site, I stopped on my way homewards to see the cathedral at Llandaff, which was just then emerging from the condition of ruin and spoliation in which it had lain, in picturesque confusion, ever since Mr. Wood's unfortunate effort to convert it into the semblance of one of his favorite assembly-rooms of his own town of Bath had happily been but partially carried out. I was then courteously shown over the works in progress by Mr. John Prichard, the diocesan architect, under whose immediate charge they were. Shortly afterwards I received an invitation from that gentleman to join him in partnership, an offer which I accepted, and this led to my going down to reside with him at Llandaff.

The cathedral of that little city (which is in fact only a suburban village in the neighborhood of the town of Cardiff), with its lovely and refined Early English proportions and detail, thus became my constant study and source of inspiration. Its beautiful western front in particular, the exterior and interior of which form two distinct compositions in perfect harmony the one with the other, roofless and festooned with ivy when I first knew it, seemed, as it still seems, to me to be a model for graceful proportion and refined treatment of mouldings. I quite revelled in its loveliness, thinking it to be one of the choicest examples of that style which England has made specially its own, and of which it may be fairly more proud than of any of the others which it shares in common with other countries of Christendom. The carved foliage of the interior of the cathedral was to me a continual source of delight. It is most sparingly used, as if it were jewel-work; and indeed it is as precious as if it were so. It is of the finest type of Early English foliage, the flow of the lines of which have remarkable grace and freedom; the stems are clear and vigorous, and the trefoil-shaped leaves are excellent in outline and surface modelling. I sent up a collection of casts taken from them to the Architectural Museum, and there is nothing to my mind among their treasures to surpass or even to equal them. This carved foliage of Llandaff is, in my opinion, the perfection of that particular class of work which is seen in its very earliest stage, budding out as it were of the simple Norman cushion-work of the capitals of St. David's Cathedral, and which is to be found revelling in its richest and wildest profusion in that of Wells, but nowhere with such developed fulness and power, and yet with refinement and restraint, as at Llandaff. Very noticeable, also, are the simple but noble piers of the main arches, with their alternately wide chamfers and groups of triple shafts. The effect of these piers is not improved by the access of richness that is seen in those which have been imported into the church of Llanidloes, in Montgomeryshire, which has just been restored by Mr. Street. They were removed from the now destroyed but once marvellous abbey of Cwrn Hir, in the same county, the number of arches in the main arcades of which are said to have reached the unprecedented number of twenty in succession. In these piers the triple group of shafts occur on each face of their octagonal piers, and their capitals are all united in one rich band of foliage of the character of which we are speaking, but of inferior excellence to that at Llandaff.

The ordinary diocesan work, in which I became at once fully occupied, consisted largely of church restorations, and to my share fell principally those works which were situated in the archdeaconry of Monmouth, under the able and vigorous direction of its energetic archdeacon, whose habit it was to map out his district, and to appoint a visitation to various churches, the dilapidated condition of which required immediate attention, and to take me with him on those occasions. Upon our reaching one of these, possibly some few minutes later than it had been intended, he would first ask me to note its deplorable state, which I could not but admit was tolerably obvious. He would then inquire of me what could be done with it, premising, however, that there was no money to be found. To this problem I would reply that its solution and the course to be pursued was far less clear. Nothing daunted, he would then explain to the assembled vicar and church-wardens that he had brought me there simply in my capacity of diocesan architect, which meant that they might set their minds at ease, for the present at any rate, on the subject of fees: but that, as I happened to be there I might as well take the plans and particulars of the church, so that in case I should be sent for upon some future occasion I might be prepared. He would then allot me about half an hour, proffering me his own assistance, when wanted, as a tape-holder. Under such pressure I soon learned to systematize proceedings, first sketching in succession the plans, elevations, sections, and details, and then noting down the necessary dimensions; this having done, we proceeded to perform the same task at the next church upon our list. On my return home I plotted out these several sketches, and though of course, when actual work was contemplated at any of these places it became necessary perhaps to make another and more careful survey, much time had been saved, and the opportunity given for preliminary consultations.

AVALLON AND VEZELAY.

THOSE of our readers who remember the sketches, both verbal and graphic, of Avallon and Vézelay published in the *American Architect* some time ago, will probably derive further pleasure in reading the following impressions of a correspondent of the New York *World:* Any one who arrives at Avallon by rail will find very little at first sight to attract his notice. There is a right way and a wrong way of approaching every town, but no place that I have ever seen suffers so much as Avallon from being seen first from the railroad. No one who views it from that point alone can form the least idea of the magnificent position which the town occupies, or of the grand range of picturesque hills and valleys and forests which stretch away for many miles below it. The little-known Morvan region so often referred to by French novelists and writers, and so seldom visited by French travellers, extends to the south for many miles, and considering its great attractions and the very slight difficulties which the tourist is likely to encounter in passing through it, it is astonishing how much it is neglected, even by artists. The people have the reputation of being quick-tempered and passionate, but my own experience is that civility here, as everywhere else, is met with civility, and that the stranger is not likely to encounter any disagreeable incident if he does not wantonly provoke it. It is true that the accommodation is not magnificent, even in the towns. There is a very fair inn at Avallon, but beyond that nothing is to be looked for but the humblest fare, in the meanest sort of roadside *auberges*. There is one peculiarity of French inns everywhere which it takes a little time to get accustomed to, and that is the incessant din which goes on all day and nearly all night. Nothing can be done without a great deal of shouting and noise. At Auxerre, the soldiers with whom the town was crowded were singing and shouting until a very late hour, and after they were gone, the hotel servants appeared to be indulging themselves in a wild carousal. Towards one o'clock in the morning, just as it began to be possible to think of going to sleep, I noticed a strong smell in my room of something burning. I thought that the smoke was coming in from an open window, and paid little attention to it, but gradually it increased, and presently I heard wild scurrying of feet in the passage and a number of excited voices all shouting away at the same time as hard as they could go. I opened the door and found the corridor and staircase full of smoke, while a number of Frenchmen were running hither and thither in a high state of excitement. Clearly there was a fire somewhere or other, but every room was searched without leading to its discovery. Two or three of us went up to the next floor and opened every door, the landlady following, wringing her hands and crying, the cook bringing up the rear in his night-shirt, but with his white cap on his head in readiness for any emergency: a French cook, apparently, never takes off his white cap, even when he goes to bed. By following up the scent we at last came to the room where all the mischief was going on. It was full of smoke, but the occupant was calmly asleep, and when we burst in he sat up in his bed with a stupid look of surprise, neither smoke nor noise having in the least degree disturbed him. He was one of the waiters and had gone to bed with a lighted candle, without a candle-stick, by his side. In due time that had set fire to the chair and the clothes which were lying upon it, and the smouldering mass was sending forth a volume of smoke which almost blinded one, — but the *garçon* did not mind. He would have slept through a bombardment of the house. Who would not envy so great a gift of sleep? A commercial traveller to whom I spoke as I was going off at seven o'clock told me that he had heard nothing, and yet the hubbub near his door was loud enough to rouse all the Seven Sleepers before their appointed hour had come.

Between Auxerre and Avallon, the scenery begins to assume a little of the true Morvan character; the flat plains, monotonous and dreary, melt away into hills, and tracts of forest become visible in the distance. The vineyards are extensive, but the green and healthy appearance which they ought to present will be looked for in vain

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this year, for there has been no summer in France and the grapes will not ripen.

A long gray street at Avallon leads to a little market-place, with a short double avenue of limes at one corner of it, and at another corner stands a house with the familiar sign of "*Au pauvre diable*" over the door. There are some interesting old houses here and there, and while wandering about in search of more, the traveller will come suddenly upon a terrace from which there opens up a view such as few towns in France or anywhere else can boast of. We stand on the edge of a cliff, at the foot of which, five hundred feet beneath, a beautiful river, the Cousin, winds in and out among tree-covered hills, with an old bridge across it, and quaint little houses dotted about its borders. A vast panorama of exquisite hills and valleys unfolds itself beyond the river, and the dark forests of the Morvan compose such a background as must fill even the most ambitious and most accomplished artist with despair. Every hillside is covered with a lovely wood, and when the sun lights up the scene, as it does every now and then even in this weather, no pen or pencil could give the faintest idea of its charm and beauty. It would be almost impossible to be placed in front of so enchanting a landscape without being seized with a desire to penetrate a little farther into it, and if weeks, or even days, are not at one's disposal, the best thing to be done is to make good use of a few hours, which ought to be left open in the most hurried of journeys for Avallon. The traveller would cover himself with disgrace if he came as far as this without making his way at least to the capital of Le Morvan, the ancient town of Vézelay, with its glorious abbey church standing on the very summit of a noble hill in the midst of wild crags and forests through which there wanders another beautiful stream called the Cure.

There was no great difficulty in getting what is called a "brëach," or break—in reality an old wagonette—close by the Hôtel de la Poste at Avallon. We had come on breakfastless from Auxerre, but the traveller who arrives anywhere near mid-day at a French inn may be tolerably sure of finding something good to eat. The *déjeuner à la fourchette* is an elastic meal; it ordinarily begins at eleven and goes on as long as anybody drops in to partake of it. At Avallon, within five minutes of our arrival, a very fair soup was handed to us, followed by a dish of pike, another of rabbit, *à la chasseur* (very good), and that again by a tender *poulet* with fried potatoes. May the friendly reader never have to sit down to a worse breakfast than that!

The coachman in his blue blouse was waiting for us at the door, with a pair of white horses which he declared he had bought recently in Paris. Their appearance would not have warranted him in giving a very high price for them, but they did their work very well, and hard work it was, for the roads to Vézelay, from whatever side it is approached, run chiefly up-hill. A very striking view of the town is gained at a distance of a mile or so, set in a framework of vine-covered hills, with the spire of the old church towering high above the sloping roofs of the picturesque houses. The first village which we pass through is called Pontaubert, and it is very much like all the other villages along the road—a collection of miserable-looking cottages, most of them in decay, with old crones sitting at the door, gazing vacantly down the street, or perhaps knitting woollen stockings for the winter, which in this district is very severe. We were still at a great distance from Vézelay when the towers of the abbey church came fully into view, standing proudly on the top of what the Morvan people call a mountain, just as Gilbert White described his favorite Southdowns as "that majestic chain of mountains." Hither, in the middle ages, came crowds of pilgrims to pay homage to the sacred relics of St. Marie Madeleine, to whom the church is dedicated. St. Louis and other kings of France made the pilgrimage to Vézelay for this purpose; but in 1569 the Huguenots seized these relics and burnt them in the market-place. It is clear, indeed, from the immense size of the church that Vézelay must have been a place of great importance, and it is upon record that in 1145 St. Bernard preached a crusade here to an immense concourse of persons, and that in 1190, Richard Cœur de Lion joined his forces with those of Philip the Second and that 100,000 men were assembled on the plains of Vézelay. But none of the ancient glories of Vézelay remain except its church, the streets are silent and deserted, and a small local guide, which I bought at a wretched little general store sorrowfully confesses that it will not be long before "Vézelay will become a deserted town, having nothing but its ruins to offer to the contemplation of the philosopher and the historian." But the artist will always seek out Vézelay as one of the most attractive spots in all France, for almost every inch of the country has a peculiar beauty of its own. At a turn of the road, a couple of miles or so from the church, I noticed a little field-path which appeared to be worth pursuing. The driver told me that the *sentier* would lead across to the main road again, and therefore I speedily jumped out and followed it. It led among beautiful wild flowers and over rocks to the very edge of a high cliff, beneath which flowed the River Cure, dancing and sparkling in the sun like a stream of silver. It was not unlike some of the prettiest dales in Derbyshire. From this point the road winds round and round until we reach another squalid village at the foot of the hill on which Vézelay stands, where there is a very curious old church called St. Père-sous-Vézelay. Time has imparted to the exterior all sorts of rich colors, and the porch once sumptuously decorated is now fast crumbling away. Everything within and without is fallen to decay, but the church is still a grand edifice, worthy of a better fate than to be left stranded and forsaken amid a scanty population of old men and women bent double with age and infirmities. Such a collection of withered and wrinkled human beings I never saw in any one place before. Then one ascends by a steep road to Vézelay, and at last the long roof of the church with its grand towers stand before us—an object of the deepest interest to any man who has the slightest appreciation of architectural triumphs or any reverence for the associations connected with the early Christian churches of France.

Fancy a church 404 feet in length and 70 feet in height placed at the summit of a lonely hill in the heart of a forest district, where the people, according to French authorities, are to-day but a few steps removed from barbarism! It would be difficult to bring a hundred men now within the walls which would contain at least 5,000. The building is of exquisite proportions, but it has been restored by M. Viollet-le-Duc, and he was a gentleman who went about the work of restoration with no gentle hand. He made all things that were old look as if they were new. The Norman arches have all been refaced, and the mortar has been picked out with a dark color, so that the edifice looks as if it might have been built last week. The "narthex," which has helped to make the church so celebrated, dates back to the eleventh century, and is adorned with some beautiful twisted pillars and a variety of rich carvings in stone. From a gallery above this there is a superb view of the whole interior — a sight not soon to be forgotten. I mounted up to the top of the tower, and from the outside, there was the whole of the Morvan spread before one, and many a league of wild and beautiful country, the blue hills in the distance completing a picture which no one can ever forget who has had the good fortune to gaze upon it. The grandeur of the position of Vézelay can only be fully realized by those who have taken the trouble to climb up the ladders which lead to the outside of its highest tower.

Full of wonder and admiration we bade adieu to this marvellous structure and sought some modest refreshment in the *auberge* of the village. We asked only for bread and butter, and that was soon obtained, together with a bottle of the sourest wine I have ever yet come across. The thirstiest of travellers would find a little of it go a long way. But one does not come to such a place as this to think about eating and drinking. It is not possible to live upon scenery alone, but the charms of Vézelay are enough to subdue the meaner appetites for at least two or three hours. And less than that time sufficed to carry us back to Avallon, whose spires and houses were shining in the rays of the setting sun like the celestial city which Bunyan saw in his dreams. A day spent in scenes such as these is not likely to pass from the memory until all other things fade away from it.

THE ILLUSTRATIONS.

PUERTA DE DOCE CANTOS, TOLEDO, SPAIN.

[*Chromo-lithograph.*]

THE Moorish gateway here shown is situated at the left of the Bridge of Alcantara. The gateway in front, ornamented with the arms of Charles V, was built in 1575, by Philip II. Several persons have asked for more particulars concerning these German prints than were given in our issue for November 25; this, we regret to say, we are unable to give. The only further information we possess is that they were obtained, quite by chance, in Europe some fifteen years ago.

SKETCH IN ROUEN: CHURCH OF ST. LAURENT. BY ANDREW T. TAYLOR.

[From the *Builder*.]

The Cathedrals, St. Ouen and St. Maclou, Rouen, are pretty well known to all travellers, but the church, with its interesting tower of St. Laurent, most of which dates from the fifteenth century, standing in the Rue de l'Hôtel de Ville, is not so well known, and is often overlooked by the hurried visitor; but it will well repay a visit. The church is desecrated and abandoned to ignominious uses, and it is but the wreck of its former self, but the tower still rears its head, shorn, indeed, of its tiara crown, but beautiful still in its bold, open tracery and pinnacle work; airy, yet strong in its construction, and full of a subtle play of light and shade.

EBENEZER CHAPEL, DEWSBURY, ENGLAND. MR. W. HANSTOCK, ARCHITECT.

[From the *Architect*.]

The new building will be 87 feet long and 54 feet wide. The plan of the chapel is a simple oblong, without any projections in the shape of transepts, etc., whatever. The entrance is in the centre of the front gable, consisting of two doors 4 feet wide, each opening into a corridor 8 feet wide; the corridors are divided with swing doors so arranged that all persons must pass through three swing doors before entering the chapel proper. The internal dimensions of the chapel are 69 feet long and 47 feet 6 inches wide, exclusive of organ chamber. There will be two aisles in body of chapel, the seats in centre being straight and those at the sides splayed. The organ chamber is recessed from centre of end of chapel, and is 20 feet wide and 13 feet deep, the ground floor vestries being on each side of organ chamber. The rostrum pulpit is directly in the centre of the organ chamber, and the choir-stalls are treated in an original manner for chapel work by placing them on each side the rostrum, and forming the sides of communion, so that they will

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sit face to face, similar to the choir-stalls in the chancel of a church. Galleries will continue along each side of the chapel quite straight, and the gallery over entrances will be much deeper for children's seats. The chapel floor falls from front entrance to rostrum slightly. The roof is all in one span, but divided internally into nave and side aisles, and the clerestory arches are supported by ornamental cast-iron columns. The height from floor-level to eaves of roof is 27 feet, and from floor-level to apex of roof 51 feet. The style of architecture adopted throughout is Decorated Gothic of the thirteenth century. The whole of the front gable is out of the best white Holmfirth ashlar, and wallstones clean boasted. The slating will be the best Westmoreland with dressed stone ridges. The wood-work throughout will be of the best quality of pitch-pine, which is intended to be varnished. The accommodation in all is for 836 persons, allowing 20 inches for each in length, being 436 in the body of the chapel and 400 in the galleries.

ST. NICHOLAS, FAMAGUSTA, CYPRUS.

[From the *Building News.*]

The letter from Cyprus published in our last issue will lend an interest to the Cathedral of St. Nicholas, which was greatly injured by the Venetians but still retains much beauty. The style is a somewhat late type of Decorated, some portions being almost Flamboyant in character. It consists of a nave, with aisles, of seven bays, having four-light side windows of two stories, and at the west end low towers on either side, rising one stage above the roofs, and three doorways. At the east end both nave and aisles end in semi-octagonal chevet-chapels, and on either side two chapels project from the eastern portion of the building.

SKETCHES FOR THE INTERIOR OF THE NEW CLUB-HOUSE, GLASGOW. BY MR. T. RAFFLES DAVISON.

[From the *British Architect.*]

CAMPANILE OF AN HOTEL DE VILLE. M. RONDIER, ARCHITECT.

[From *Le Moniteur des Architectes.*]

DESIGN FOR THE SIDE OF A DRAWING-ROOM. — FIRST PRIZE.

[From the *Cabinet Maker and Art Furnisher.*]

HOUSE FOR MARCELLUS WALKER, ESQ., COHASSET, MASS. MR. W. E. CHAMBERLAIN, ARCHITECT, NEW YORK, N. Y.

ARMORY OF THE FIRST REGIMENT NATIONAL GUARDS, PHILADELPHIA, PA. MR. J. H. WINDRIM, ARCHITECT, PHILADELPHIA, PA.

AN ANNIVERSARY:[1] DECEMBER 9, 1881.

THE CURSE ON THE RING THEATRE.

"A curious incident happened to me to-day as I was passing the spot. I saw an old man, with a white beard, constantly trying to break the ranks of the soldiers and police before the theatre. I heard him call out, 'I knew my curse would some day be fulfilled.' This he repeated constantly. I followed him through the crowd, and asked him why he said this. He exclaimed, 'Don't you know that this very spot, now a great grave, was the scene where, in 1848, nine revolutionary martyrs were shot. My son amongst them stood where now we stand. On the spot where later the theatre was, there was a ditch before the barracks, and earth-walls called the Glacis, now the Ring-Strasse. There I stood while my son in the ditch with eight others was shot by the soldiers. Many other people were shot. Some time later, during the assault of Vienna, I saw some falling and cursed the spot, and knew I should not die before my curse was fulfilled.' On leaving him I inquired further. I find his story was true. There really was a spot before the barracks where many were shot and hanged, and it was thought by many when the Square and Ring Theatre were first built that the spot was unlucky." — *Standard Correspondent writing from Vienna, on the evening of December* 11, 1881.

[1] From the *Fortnightly Review.*

SENEX *loquitur.*

I.

This is my hour; it has come, it has come; and, at last, I can say,
Vengeance is mine for the hell, for the horrible hell of that day:
The balance has swung to my hand, I am paid for the travail of years:
This is my hour; I have lived for it, watched for it, sought it with tears.

II.

Who are you that have come, without calling, to pry and to hear what I speak?
Magyar you are not, I know, and you scarce look like Austrian sneak;
Englishman? What would you have, sir? The meaning of words that I raved?
Nay; you endure not denial. It matters not; surely I've braved
Fate-buffets oft; shall I crouch to you now, shrink my secret, I quail
Now, when to-day my life-longing is crowned? No; I'll tell you my tale.

III.

Look at the flames that leap yonder, upraised, and in mirth storm the sky.
Who made that death-dance? I'll whisper your ear: it was I! it was I!
Music, the throngs, and the theatre; sudden the blaze, the hot rush;
One breath of silence; then scarcely the strongest escapes from the crush.
Weak, all alone, I have feasted these revellers; I am the bell
Startling the dissolute city from sleep with a clamorous knell.
Hark to the shrieks, and the terror, the mourner's moan; little they know
I have decreed them this doomsday, or how my heart warms with their woe.
None of those red-hearted fellows, that roar and rejoice as you see,
Thrills with the tempest of gladness this day's deed has shed upon me.
Truly they joy in their liberty, whistle their freedom-song shrill;
My rare delight is more perfect; I've gained my desire; got my will.
Look, how they laugh to me, calling, "You gave to us life;" do you hear?
Hark how they talk to each other, each telling my tale to his peer.

IV.

No, I am not mad, though you deem so, I see, by your pitiful smile:
(Well! if I am, I have trod the same way for a desolate while:
Years upon years; oh, so weary of waiting! for thirty and more;
Ever the pain at my heart, and the patience, and hungering sore)
No, sir, no dotard am I: this, my work of the night-watches, few
Others who ever have dwelt on our earth, or shall ever, could do.
Never a brand have I borne to light up the funeral pyre;
Never a match struck, nor cast on the ground; no, nor fanned at the fire.
Nothing of these have I done, and yet no one has wrought this but I.
Listen, and know Fate is fast to the hours, while ages roll by.

V.

Look you around on this place, as you can through the gloom where we stand;
Here, years agone, there was brought, in the gray of the morning, a band,
Fettered, but free in their chains; as the day dawned with joy-bringing breath,
Here, as the warm world was pulsing to life, they were driven to death,
Nine to be shot; and their sin? They had wrestled for liberty; one,
Bravest of all, and best prize for the hunters, a hero — my son.
Ay! you may scorn the pale jackets; but spare the worst hate that you have
For a curse on the strength of that stench in the nostrils of Europe, the Slav.
Faugh! To be choked by those buzzards, whose ravin is red o'er the world —
We, who have highest descent of all peoples, who else had unfurled
High on the ramparts of Hungary's cities, the standard her own;
Beat down the Austrian Eagle, and tottered the Austrian throne.
O that all Europe would band, to cast forth from its borders that race —
Muscovite, Servian, Bosnian, all to blot out by God's grace!

VI.

Pardon — I'm old, and my talk runs away from my keep, and grows wild.
Back to my story; how say what I must? Quick — they slaughtered my child.
None had I other ('t is age that unmans me), his mother was dead;
There he lay life-lorn, with face, oh, so white, and with vestment so red!

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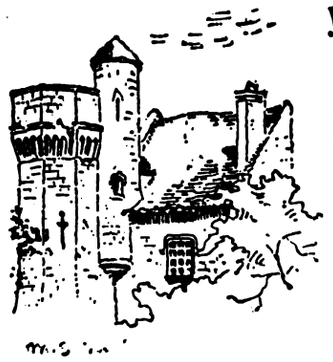
I — how it hisses, the fire — shadow-sheltered from spies, saw the crime;
Stayed, having seen it, as swooned, with no count of the passing of time;
Till, creeping forth in the dusk, I shivered, as fronting me lay
Blood from the corse on the ground — a black blot in a silver moon-ray;
Outstretched my arms, and, with voice loud and long, pealed a prayer to the sky,
Sobbing and gasping on God to grant to me, ere I should die —
Ere I should die and go down to the grave and the dust of my boy —
One hour of vengeance unmeasured, revenge without let or alloy;
Set then my gaze toward the rampart, ghost-haunted, and — dumb for a space,
Passion-throttled — found speech, and, with hand held aloft, craved a curse on this place.
Still shone the stars, and the dim rack of night sped through heaven, and no sign
Came, bringing word that my plaint had found way to the dwellings divine.
Nay, but I knew all the while it was sealed; nor have once been afraid
That the high God had not heard in His house, and would grant what I prayed.
He has helped in the wail of these mothers and widows who grovel on earth
For the cinders and wrecks of the fury that fell on the midst of their mirth.
Look! the red demon outdying, the ruin, and say if I lied
Then, when I told you this death-dance was tuned to my music, who cried
Loud to the God who has heard me, and made for my answer this fire.
Praise to the God who has heard me, and bodied my dream, my desire.

VII.

Ask you, aghast, "Do I dare to declare this destruction from God?"
This He can work who can mantle the firmament o'er by His nod;
Tear up heaven's face with the clash of His clouds, rouse the ship-shattering sea;
Rend the wide earth, till it yawn and devour. He has done this for me.
See you: they slaughtered my son, shot him down like a dog; shall not I
Reckon Him righteous and just who gave heed to my masterful cry?
Nay; you are wroth. I but mock you with arrogant words, and blaspheme,
Crying, "This ransom from God; this my recompense?" Think you I dream,
Knowing this furnace was kindled and blazed for the death of my son?
Hundreds of souls shrivelled, say you, no equal atonement for one?
Lo! the meet measure is full to the brim, and is bounteous as late.
Year upon year, for this day, with my hope I was suffered to wait
Till that the hour that is come should be here, and my prayer should be blest.
Now it has come, even now; I have seen it, and go to my rest.
Talk not to me from your book-lore; I'm naught of a scholar; these eyes
Read but the earth, and the day, and the darkness, and look of the skies.
God never fashioned this fire, so you say; but however it be,
He who has sent me revenge is my God, and a good God to me.
Now from the dust I am lifted; day breaks, and all seems to me right.
Faintly the flames flicker down. My story is told you; good-night.

PROGRESS OF THE STREET STEAM-SUPPLY IN NEW YORK CITY.



THE laying of steam-pipes in the streets of the lower part of our city has made rapid progress the past summer and fall, almost too rapid, we think, to be substantial and free from the every-day mishaps now occurring. Defective pipe and fittings and misjudgment in the selection of material for packing the flanges, together with insufficient testing before the closing of the trenches, has resulted in the blowing out of joints, the breaking of flanges, and the digging up and blockading of the streets over and over until the patience of the mercantile community is well-nigh exhausted. The spirit of rivalry between the companies has been carried to the reckless extent of doubling the lines of pipes in many streets, to the detriment of all other franchises and interests without giving satisfaction to the takers of steam.

Although there may be competition wherever there are rival lines as well as the cutting of rates, the gain is not equal to the nuisance of the continued disturbance of the streets and increased temperature of the water-supply from the proximity of so many steam-pipes.

Is there not room enough for the expansion of two live steam companies in our great city without doubling up their lines of steam-pipes under our streets to the detriment of all other interests?

The blockade of the streets alone by one company is a nuisance, and what must it be when the rival company repeats it; but when packings blow out to such an extent as to fill the streets with steam and jeopardize life, it becomes time to suspend the extension of the lines, and endeavor to perfect the work already done.

The general plans of distribution of the two steam companies are nearly the same, but the details of the laying of the street mains vary somewhat. The flange packings of the New York Company are corrugated copper gaskets or washers. These have so far proved the best that have been tried, but the paper-gaskets upon the valve-bonnets have been the cause of several blow-outs. The expansion joints of this company are disks of copper fastened by their inner edge to the end of a line of pipe, and by their outer edge to a short flanged cast-iron cylinder, making a flexible joint upon the same principle as has been so long in use upon the main steam-pipes of our large steamers; the same arrangement in principle being also in use for accommodating the unequal expansion in the steam and exhaust connections of large cylinders.

This class of expansion joints have had a long trial, and have been found faultless for small variations, but having so little range they are hardly a criterion by which to judge of the success of the copper ones, which are subjected to much strain and flexure. The line-pipe is felted or covered by a thickness of about two inches with mineral wool, the whole being inclosed in a case of wood, made by boring out large logs and splitting for the convenience of inclosing the pipe and inserting the felting; the whole being made as nearly impervious to water from the outside as possible by asphalt felting.

The flange packings of the American Company, as we hear, were at first made with gaskets of compounds of rubber, plumbago, and other materials, a variety of which are made under various patents. They are too plastic, and are liable to give way under pressure and heat before they become set or vulcanized, and therefore require setting up by the screws or bolts for some time previous to closing the trenches. A few hours' testing with an inadequate supply of steam upon small sections is entirely insufficient for perfecting the joints. We understand that asbestos is being tried as a packing, but we fear that it is too frail a fabric to stand the continued pressure and the flexure from large and rigid pipes.

The line-pipe of this company rides upon friction rollers within a box of heavy plank, which is thoroughly treated with coal-tar, the top and bottom of the box being laid crosswise and filled in with pulverized charcoal.

The expansion joints are of the sliding type, made of brass or composition, with brass bearings. They have a great range, and therefore require a less number in a given distance than those of the other company, but the packings require frequent attention. — *Scientific American.*

THE DURABILITY OF BRICKS.

A REPORT on the general question of the properties which glazed bricks should possess was lately issued by the Hanover Architects' Society, and touching as it does upon many points more distinctly affecting the manufacture of such bricks than their use in building, it is not surprising that the subject has been taken up in a practical manner by a leading organ of the German plastic industry.

In a somewhat elaborate treatise on the question in the *Thonindustrie Zeitung*, Herr Rühne disputes the assumption that no progress had been made in this class of work until the fourteenth century, and brings forward many interesting facts to prove the diversity of the processes now in use in the manufacture of glazed bricks; also elucidating from the point of view of the brick manufacturer some of the questions raised as to the most suitable and economical method of applying the glaze.

He brings forward some arguments of weight in order to disprove the theory that the work of the Middle Ages in this particular branch was more free from crazing, and consequently more durable, than the productions of our own times. He is quite ready to admit that such specimens as have been preserved are models of careful workmanship, but asks whether any positive proof exists that all the work contemporaneous with that which has come down to our day, was equally perfect.

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In his remarks on the subject, Herr Rühne goes farther than the Hanover Architects' Society, and discusses at some length the question as to what are the influences which a brick is expected to withstand during a long series of years, or even during the lapse of centuries. He records the fact that weather usually affects bricks in consequence of the changes of temperature which occur, and the formation of ice which is thus induced; as also by the influences of rain-water and of gases which may habitually or accidentally be found in the atmosphere. These attacks are thus of a chemical as well as of a physical nature. The chemical influences are such as are connected with decomposition through the action of carbonic acid and other gases in the atmosphere, and by the dissolving or removal of particles of stone by rain-water. The crystalline salts which sometimes appear upon the surface are, it is remarked, mostly produced under circumstances which are injurious to the durability of the material on account of the increase of volume which takes place. The danger is all the more real because, at the next fall of rain, these crystals return into the material in a state of solution, and when dry again become crystallized, thereby producing a splintering effect. Although scarcely noticeable in the first instance, yet the continued repetition of the process which is induced by every shower of rain constitutes a destructive agency which, according to Herr Rühne's theory, is capable of causing the decomposition of a brick when a sufficient quantity of these salts are present in it.

The effects of frost, though of a similar tendency are, he remarks, more of a mechanical character, as the extension of the volume of water through freezing operates towards the destruction of the brick. In spring and autumn the extension and contraction of bulk, caused by the wide range of temperature comprised in the daily thermometric variations, are specially calculated to affect the portion of the brick nearest the surface. These various influences of a more or less destructive character are rendered specially effective by any irregularity in the resisting properties of the substance of the brick, which should be homogeneous and free from stones, lime, or similar foreign substances. Homogeneousness further implies an equal tension throughout the brick. In machine-made bricks it is remarked that it is by no means unusual to find on the outer surface a layer of finer-grained material than in the other portions. In fact, it is urged, that for purposes of a monumental character machine-made bricks should not be used, more particularly as glazed bricks. Hand-made bricks, it is considered, should be moulded and heated in general with due observance of special measures of precaution when durability for a period of several centuries is expected from them.

When frost sets in, such congelation as may exist within a brick that is glazed, is by that fact prevented from following out its natural course of extension in the only direction in which it is not closed in. Thus, it is argued that a glazed brick is exposed to a more severe test than an unglazed one, with the result of the forcible destruction of the glaze in some instances. The inference is drawn from this fact that the position of glazed bricks in a building has a certain influence upon their durability, and various facts are quoted with a view of proving that too much must not be expected from them.

In conclusion, Herr Rühne draws from the foregoing explanations the following theoretical and practical inferences: —

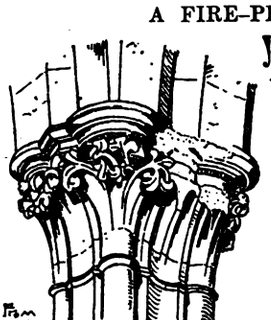
1. Weather-proof bricks must not contain any soluble salts; and their formation, as well as their baking, must be carried out so as to ensure this result.

2. They must resist the attacks of carbonic acid in a fluid state. Their porosity must not be too great, and the disposition of the pores must be uniform, the bricks being thus rendered homogeneous. The porosity of glazed bricks must in particular be as small as practicable.

3. The baking must be of such a thorough nature as to resist the extension which may result from congelation. The substance of the brick must be as tough as possible, and not brittle or glassy in its character.

4. The co-efficient of extension must be low, in order that a change of temperature may have as little influence as possible on the interior of the brick. — *The Builder.*

A FIRE-PROOF STRUCTURE.



THE fire-resisting properties of brick, concrete, iron, and asphalte, although acknowledged, are not always employed to the best advantage, and it is in the judicious combination of those materials that success is to be achieved. A new building has just been erected in the rear of the Natural History Museum at South Kensington, intended as a spirit laboratory or store, which is worth notice for the manner in which the materials have been used, and the means employed to check fire. The very inflammable nature of the spirits employed in preserving specimens rendered it necessary to construct an insulated building with the appliances requisite for an immediate subjection of flames. We may explain this new building or store as a plain parallelogram-shaped structure, with a basement about 154 feet in length, by 53 feet in width, built of white brick with terra-cotta dressings. The principal area is divided by two rows of cast-iron columns which support the girders carrying the roof. Round the walls are arranged cases, and the floor is perforated by a number of openings with iron gratings above the basement, the object of which is to drain off the water and diluted spirit which may be poured into the building in the event of a fire. The walls are pierced on both sides by numerous windows of rectangular shape placed high up, and below these the cases will be placed. Around the walls, at intervals, hydrants will be fixed outside, with nozzles below the windows and above the cases; so that, in the event of conflagration, water may be turned on, and the whole building flooded. The surplus water will be drained off through the gratings in the floor, and a thick layer of ballast in the basement will absorb the water and spirit, and so extinguish the flames.

The construction of the building is worthy of remark. The columns, as we have said, are of iron, and these are hollow, and surrounded by wire netting, fixed on wooden fillets, to form a "key" for the plaster and fire-proof cement with which they are encased. The iron columns will thus be protected from the action of the flames and the air-space and cement will keep them comparatively cool in the hottest flames. The columns have capitals of good design, and carry iron girders which are similarly encased with wire netting and cement below the bottom flanges. The roof, which is quite flat, is constructed on iron rolled I-girders, placed 5 feet apart. Between these, flat, segmental cement-concrete arching is constructed, turned upon centres, allowing a thickness of about 5 inches at the crown of each arch, and formed to a curve of about 1 inch in 6 feet. Gutters are formed all round, and a parapet of brick surrounds the flat. To insure a thoroughly water-tight and fire-proof roof, the authorities have laid it with Claridge's Pyrimont asphalte, a material which has been found to be as impenetrable by flame as it is impervious to wet. We find, from an examination, the whole roof is covered with an inch layer of Claridge's asphalte, laid in two thicknesses to a fall of about 3 or 4 inches from the centre each way. The gutter, about 12 inches wide, is lined by the same material, with outlets, and the flashing is formed also by asphalte plates 1 inch in thickness, with angle fillets where it joins the gutter, and weathered at the top edge, where it is made to enter a groove or cut sinking in the brickwork as a check to the entrance of wet. The chimney-stalks are flashed in the same manner, and throatings are formed wherever necessary. The whole surface presents a firm, clean appearance, the top coat being covered by a layer of sea-beach grit, which gives a finished and pleasant foothold to the mastic. About 8,000 feet superficial of roof has been covered by the Claridge's patent asphalte. We were pleased with the capital surface and neatness of finish of the gutters and flashings, which surpass lead-work and afford another instance of the successful adaptation of the asphalte of this firm. The work has been well executed by the company's men, under Mr. Farrell's superintendence. Architecturally, there is not much to notice: the windows are finished with terra-cotta dressings and flat heads formed of blocks with radiating joints, joggled together. The plinth has a course of terra-cotta with a simple splay below a roll; a string-course of the same material gives a little relief below the windows, while above them there is an effectively designed terra-cotta cornice or corbel-table, with copings of terra-cotta on the parapets. When the Natural History Museum was commenced there were misgivings as to the success that would attend the use of terra-cotta on a large scale. It is satisfactory to find a considerable improvement in the manufacture, and the cornice and string-courses of the building we have described are evenly burnt and truthful in line. Mr. Alfred Waterhouse, A. R. A., is the architect, Mr. G. Shaw, the builder, and the building has been carried out under the supervision of Mr. Alflatt, foreman.—*The Building News.*

THE $3,000-HOUSE COMPETITION.

NEW YORK, N. Y., December 14, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen,—In your competition for a small cottage, do I understand that the architect is to sign his name or cipher; also, what is the arrangement in regard to returning drawings.

Yours respectfully, H. HUDSON HOLLY.

[As usual in these competitions, drawings are expected to be signed in cipher. All drawings are returned after criticism and publication of the most noteworthy.

As it is some time since we have published in full the regulations governing these competitions, we here repeat them: —

REGULATIONS.

1. Every competitor, by taking part in the competition, signifies his willingness that his design be published in the *American Architect and Building News*, if the editors desire to publish it.

2. Each competitor is to submit two drawings, each measuring 14" x 22," within the inner framing line, the drawings being executed in pen and ink, on smooth white paper, in a manner suitable for reproduction in this journal.

3. The authors of the successful designs surrender to the publishers all property right to their respective drawings and designs.

4. In awarding the prizes heed will be taken of the manner in which the programme has been followed, the excellence and appropriateness of the design, and the execution of the drawing.

5. Each competitor is requested to sign his drawing with some motto or simple device, which can be recognized from its verbal description, and to

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enclose to the editors, together with his *nom de plume*, his real name and address.

6. The drawings are to be received at the office of the *American Architect and Building News*, 211 Tremont St., Boston, Mass., on or before Saturday, January 13, 1883.

7. Drawings which are received after the day named will be excluded from competition, but not necessarily from criticism and publication.

A CORRECTION.

West Granville, N. Y., December 11, 1882.

To the Editors of the American Architect:—

Gentlemen,—In the last number, No. 363, p. 283, under the heading of Monthly Chronicle, it says, "November 10, a magazine near Troy, N. Y., containing four tons of powder explodes. No one hurt." I think this is a complete misstatement: it should read, "A magazine attached to the lime quarries, at Smith's Basin, Washington Co., N. Y., containing four tons of giant powder explodes. Two men killed." Without a shadow of a doubt this was the accident referred to, as the place is not very far from Troy, N. Y. Of the two men killed, a hand and shin-bone only have been found.

Why was no mention made of a "House near Philadelphia," p. 267, No. 362. It is a gem, and I eagerly looked for some description.

Yours in haste, H. P. Cone.

A PROBLEM IN HOUSE DRAINAGE.

48 Gilfillan Block, St. Paul, Minn., December 14, 1882.

To the Editors of the American Architect:—

Dear Sirs,—A problem in drainage is puzzling me, which I would like your opinion upon:

I have to put in the foundations for a large house here that will unfortunately come directly in a clay stratum of indefinite depth, underlying the entire site of the house as well as the surrounding neighborhood. There is no sewer to drain to, and the ground is quite level, affording no opportunities for drainage anywhere.

The problem with me now is: How am I to obtain a dry cellar, and what shall I do with my house sewage?

If you will kindly answer the queries in your next issue, you will greatly oblige, Yours very truly,

C. C. C.

[We should set the house as high as possible, say four and a half or five feet above the present ground level, and bank up around it with all the material excavated from the cellar, leaving about two feet of underpinning exposed, and giving the grade a long slope away from the house. If the cellar is eight feet deep in the clear, this will bring the floor of it three or three and a half feet below present grade. The foundation should extend two feet below this. For a wooden house, the lower eighteen inches of the foundation walls should be laid dry, either in stone or very hard brick, beginning the cement or mortar wall about six inches below cellar-floor. A reservoir will thus be formed beneath the foundations, which will keep the cellar-floor dry under ordinary circumstances. Cross-drains of tile or "French drains" may be laid across the cellar to connect with this main reservoir, if the house is very large. Outside the wall it will be necessary, to avoid dislocation by frost, as well as to keep moisture from contact with the wall, to fill in a few inches of gravel or cinders; but the surface of this should be covered with clay or loam, well rammed, and sodded or concreted, so as to throw the water which will run down the sides of the house in heavy rains away from the wall at the foot, as otherwise it will collect in the narrow pocket of gravel or cinder filling, and burst through the wall or overflow the reservoir beneath the foundation.

These precautions will probably be sufficient, even in a very heavy clay, unless the excavations should cut through a spring, or a vein which might become a spring in rainy weather. In this case the spring or vein must be traced to some distance from the house, and intercepted by a trench, sufficiently long and deep to dispose of all the water running into it. The trench may then be filled nearly to the top with gravel or rubbish, and covered over with loam.

For disposing of the house sewage, the most satisfactory device in such a soil is the subsoil irrigation now much practised. For this purpose C. C. C. must remember to have no plumbing below the first story, as the fall must be continuous from the lowest trap to the irrigation pipes, ten inches below the surface. A flush-tank should be placed in some part of the line, with a grease-trap between it and the kitchen sink, and a collecting reservoir of brickwork in cement will be necessary.

Further details of this system may be found in former numbers of this journal. For such a house as C. C. C. mentions, about 1,000 feet of 2-inch sole tile will be needed for outlet-pipe.—Eds. American Architect.]

NOTES AND CLIPPINGS.

Real-Estate Sale in Cincinnati.—St. Paul Episcopal Church, located on Fourth Street, east of Walnut Street, was sold at an auction, on 14th inst., to Thomas Emery's Sons, for $85,586, being $1,301 per front foot. This sale was a voluntary one on the part of trustees of the church, and being the only piece of property sold on the principal street of Cincinnati for several years the price obtained may be set down as a fair average value of real estate here. On the next two squares west, property is probably held at a higher price; but whether it could be obtained under the hammer is difficult to say. The church lot was 66 feet 5 inches front, and 100 feet deep. The church-building is one of the land-marks of the city. Originally it was a classic structure, but was remodelled in 1864 by Mr. William Tinsley, architect, under whose pencil it was turned into a fine Early English structure. The church-building was certainly worth $60,000, and went for nothing. What the Emerys will do with the property has not yet been developed.

Alum Water as a Fire-Extinguisher.—It has been found by M. I. B. Dumas that water saturated with alum is remarkably efficient in extinguishing fires. This property is supposed to be due to the coating it gives to objects wet with it, which prevents contact with the oxygen of the air, and thus retards combustion. It is reported that, as an experiment, French firemen are to be quite extensively supplied with instruments for throwing such solutions of alum.

A New Idea.—A paper was recently read before the Franklin Institute, Philadelphia, on the use of the microscope in testing timber, and it was decided that if the microscope condemns the sample further delay in testing is not worth the while. The larger the specimens requiring to be tested the greater will be the gain the microscope will effect in avoiding the cost of further proof or the risks of using without such proof. Samples and micro-photographs were exhibited of bridge timbers which had proved faulty, but which a preliminary examination with the microscope would have promptly thrown out. The timber from which these poor specimens were taken was a fragment from a railway bridge wrecked in 1879. The timber was so excessively poor that, on mounting a specimen on the plate of the microscope, its weak and porous nature was at once apparent. The annular rings appeared about three times as far apart as they would be in good wood of similar kind. The medullary rays were few in number and short in length, whilst in good wood, on the contrary, they are of considerable length and so numerous that tangential sections present the appearance of a series of tubes seen endwise, or a number of parallel chains. After once seeing and comparing samples of good and bad wood, it is easy to recognize the difference with a pocket magnifying glass. The trunks and limbs of exogenous trees, as is well known, are built up of concentric rings or layers of woody fibre, which are held together by radial plates acting like treenails in a boat's side. The rings, representing successive years' growths, are composed of tubes, the interstices of which are filled with cellulose. The slower the growth of the tree, the thinner these yearly rings, and the denser and harder the wood—other things being equal. Not only is the closeness of texture an indication of the hardness and strength of the timber, but the size, frequency, and distribution of the radial plates which bind the annular layers together may be taken as a very close illustration or sign of the character of the wood and its ability to resist strains, especially a breaking stress. The micro-photographs of good and bad timber show that in the strong kinds the concentric layers are close in texture and narrow in width, and the radial plates numerous, wide, long, and stout, while in poor stuff the opposite characteristics prevail. The practical application consists in having such enlarged photographic sections, longitudinal and transverse, of standard pieces of timber, bearing a certain known maximum or minimum strain, and rejecting any piece which the assisted eye detects to have fewer rings per inch of tree diameter, fewer fibres, or fewer radial plates per square inch of section, or to use such pieces with a greater factor of safety. The advantage of the method is that it allows every stick in a bridge or other structure to be tested before use.—*Northwestern Lumberman.*

The Iron Mountain of Austria.—A correspondent of one of our English exchanges, in dwelling upon the trip of the British Iron and Steel Institute through Styria, gives a very interesting account of the Erzberg, a mountain of iron ore of a very rich nature, which is bounded on the south by the valley known as the Munichthal, and on the north by the Untererzberg. The Erzberg has a very peculiar history as an iron mountain. It is about 4870 feet above the sea level, and the richest ore is found near the summit, the stone being actually quarried from the face, instead of mined. Ironstone is also found in the lower portions, but it is not so rich, and the supply at the top is so unbounded that attention is chiefly directed to the high-grade ore. No exact data are in existence as to the length of time during which the mountain has been worked. From all appearances it was well known to the Romans, and is mentioned by Pliny, Tacitus, Ovid and Horace. The exact period at which it is known that operations in search of iron were resumed was in the year 712, and ever since then, as necessity required, it has been drawn upon to meet the requirements of the time. How long it may yet last it is difficult to say, but, at the present rate of consumption, it is thought that the supply will not fail for a number of years to come. In former days the mountain was divided between a number of individuals, who carried on independent operations, but their efforts were so unsuccessful that the Emperor Ferdinand II., in 1625 managed to effect an amalgamation. Little progress was made, however, as the workmen had neither the tools nor the means at their disposal which we now have, and what ore they took out was by means of drifts, many of which are still to be seen. In later times the folly of so many different interests became apparent, and finally a large company was formed to carry on operations. Their labors have been crowned with considerable success, and the output of ore is now about 1200 tons per day. Owing to the unfavorable weather during the winter, operations are carried on only from about May to August, and the winter supply is stored in sheds in the valley below.—*Iron Age.*

Security from Fire in Churches.—According to the *National Zeitung* of Berlin, the Government authorities have been giving attention to the above question. It has been recommended that in all new churches the entrance and exit doors should open outwards, where there is no special obstacle to such an arrangement. When from architectural or ornamental grounds this is not found practicable, it is suggested that doors to exclude draught should be provided, which would open outwards, and that the main doors should be kept open during service time. This arrangement would be equally applicable to existing structures. The matter is being brought before the various local and ecclesiastical authorities, and instructions have been issued for any refusal of compliance on the part of the latter to be reported to the Government.

The Bronze Statue of Germania at Neiderwald.—Considerable progress is reported from Munich in the work of casting the colossal national statue of Germany that is to be erected at Neiderwald, near the Rhine, to commemorate the victory of Germany in the last war with France. Several of the smaller parts, including the head, have already been completed, and recently was cast the largest single portion of the work—the throne with cloak lying on it, which weighs some fifteen tons. The weight of the entire work will be not less than forty-five tons.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XII. Copyright, 1882, JAMES R. OSGOOD & CO., Boston, Mass. No. 366.

DECEMBER 30, 1882.

Entered at the Post-Office at Boston as second-class matter.

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THE contractors for the State Capitol of Indiana have found themselves in a predicament which will enlist for them the sympathy of many of their fellows who have had experiences of the same kind. It has long been obvious that they were losing money on their contract, and two weeks ago, having added up the total of their profits and losses, they drew up and submitted to the State-House Commissioners a formal statement, showing that while they have received six hundred and fifty thousand dollars for their work and materials, and would, if their contract were complete, be entitled to sixty-five thousand dollars more, which is reserved under their contract as a guaranty, they have spent nine hundred and thirty thousand; or in other words, that they are two hundred and eighty thousand dollars out of pocket; and as the prospect before them is only that of continued losses, they are sensible enough, before going into bankruptcy, to state their case plainly, and ask for the consideration of the Commissioners. The latter, it seems, have no fault to find with the execution of the work, and it has been done with all reasonable prudence and economy, but the great advance in the cost of materials and labor since 1878, when the contract was signed, accounts for most of the difference between receipts and expenditures, while, it is said, an unexpectedly strict interpretation of the specifications on the part of the Commissioners has helped to make up the remainder.

UNFORTUNATELY for the contractors, the Commissioners happened to be men of a sort such as is seldom concerned in the execution of public buildings, and not only has the literal interpretation of the specifications been insisted upon, but the contractors find themselves held by a strict contract, strengthened by heavy bonds, and they have no resource but to throw themselves upon the mercy of the Legislature. It is very common in such cases for city or State governments, where real hardship is evidently inflicted upon well-meaning men, to make an appropriation of an additional sum large enough to save the contractors from loss, and in this case the contractors offer, if their bare outlay is made up to them, to carry on the work to completion without any profit to themselves, and without charge for their own services in supervision; but whether the Commissioners can properly recommend the adoption of this course is a nice question. The law authorizing the construction of the building restricted its cost in most emphatic terms, and as the Commissioners have only to call upon the bondsmen to complete the undertaking, if their principals abandon it, it is inconsistent with their duty to advise the State to relinquish the security which they have obtained for it. Perhaps the best way would be for the bondsmen themselves, if the State authorities refuse any relief, to come to the rescue of the contractors and help them to finish their work. The cost of doing so would certainly be less than that of taking it up after the bankruptcy of their principals, and they might, we think, rely with reasonable certainty on being indemnified in the end for their outlay.

RENEWED efforts seem to have been made recently, not without a suspicion of interested motives in some cases, to compel the companies which own electric wires to bury them underground. In East St. Louis, the city council is said to have voted to cut down the poles of the Western Union Telegraph Company in the town, and to have purchased a quantity of axes for that purpose; a proceeding which has very much the air of a ridiculous attempt at black-mailing the company. In New York and Philadelphia, the new and very promising scheme of the Brush Electric-Light Company for placing storage-batteries in houses along the line of the streets which are illuminated by its arc-lamps, to be filled during the day by the same current which at night is turned into the lamps, and discharged again during the evening through the Swan incandescent lamps which have been adopted by the Company for domestic lighting, seems to have awakened the hostility of its rivals, and in the former city a strong effort has been made to compel it to place all its wires immediately underground at whatever cost, while in New York, the astute Secretary of the Edison Company has made an attempt to prejudice public opinion in advance by a characteristic speech to a reporter, about the dangers of the Brush Company's plan for placing "death-wires" in the cellars of houses; the "death-wires" being the conductors by which the current is to be carried to the storage-batteries. Considering how greatly extended the use of electricity is likely to be in future, there is at least a satisfaction in the thought that the officers of so many corporations are on the alert to warn innocent citizens in regard to the risks which await them at the hands of their unscrupulous rivals.

MR. BRUSH'S storage-battery, which his company is to make use of, is at last in operation in New York, and seems to possess some excellent features. The first trial of the apparatus was with Swan incandescent lamps, twenty-seven of which were kept brightly burning for five hours by one storage-battery of twenty-four cells, charged by the current from the wires used to supply ordinary arc-lights in the neighboring street. If the Brush Electric-Light Company succeeds in escaping without serious harm from the suits which are threatened against it for infringement, not only of the Faure patent for storage-batteries, but of the Edison patents for incandescent lamps, it may, we think, look forward to a very extensive adoption of its ingenious plan for utilizing electrical energy. It will be interesting to learn whether the quality of the current with which the storage-battery is charged has any influence upon that which it furnishes to the incandescent lamps. As every one knows, the current used for arc-lights is of about ten times the intensity of that intended exclusively for incandescent lamps; the difference in quality being determined by the electro-magnets of the dynamo-machine, which, for operating arc-lights are wound with a great length of fine wire, but for incandescent lights with a comparatively small quantity of thick wire. If, as seems probable, the character of the charge in the storage-battery is independent of the form in which it is received, there must, at least, be a difference in the time necessary for charging with intensity or quantity currents, as well as in the relative economy of producing a given charge of each kind.

THE Brush battery itself, like that of Faure, and many others, is a modification of the original Planté accumulator, and consists of a number of pairs of corrugated lead plates, covered with some substance, the composition of which is kept secret, and immersed in water acidulated with sulphuric acid. When once in condition for use, the Brush battery is said to keep its properties unimpaired for an indefinite length of time. There is no change, either in the lead plates or the acid, and nothing is necessary but to add water to make good the loss by evaporation. The gradual deterioration which takes place in the Planté battery by the polarization of the plates is said to be avoided in Mr. Brush's cells, and the still greater annoyance caused by the scaling away of the oxide of lead with which the plates are coated, which is obviated in the Faure system by rolling tightly together alternate layers of lead and felt, is not experienced at all with Mr. Brush's composition.

ACCORDING to a reporter of the New York *Evening Post*, an explosion took place the other day in that city which, if it was, like the previous ones, due simply to the blowing out of

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the packing of a valve, offers a prospect for the future condition of the public thoroughfares which is far from encouraging. The explosion occurred at the corner of Nassau and John Streets, and, as the *Evening Post* says, "lifted an express wagon from the pavement," "drove paving stones about in an alarming way," "spattered passers-by with mud and lamp-black, and destroyed the stock of an apple-woman on the sidewalk." The latter individual was intelligent enough to go at once to the office of the company which owns the pipes, and claim a round sum for damages, which was promptly paid; but the passers-by who were spattered with lamp-black or were struck by the flying paving-stones probably considered their condition not much worse than that of ordinary pedestrians in New York streets in winter, and bore their mishaps in silence. The *Evening Post*, however, finds in the accident occasion for an indignant editorial, characterizing the tearing up of the streets by the steam-heating companies as an "outrageous imposition," and saying that the city government "appears to be permitted to make substantially free grants of valuable franchises and at the same time allow them to be used in such disregard of the common popular rights in the streets." All this is perhaps natural, considering the chronic state of indignation with the condition of their streets which is usual among the people of New York, but the diatribes of the newspapers would have more force if they would suggest a remedy for the evils of which they complain. That it is a public advantage in many ways to have steam delivered under pressure wherever required we suppose will hardly be denied, and although it would be desirable to carry the pipes in some other way than through the streets, no one has suggested any better mode of accomplishing the same result.

The scheme for forming a public park about the Falls of Niagara, which has been so long discussed in the newspapers, seems to have been abandoned, at least so far as any legislative action is concerned. Even in Canada, where the plan first proposed by Lord Dufferin has found much favor, the Government is unwilling to take any steps for appropriating public money to carry it out; and the State of New York is still less likely than the Dominion to make any sacrifices for such an end. It seems, however, that in default of action by the general authority something is to be done by private individuals, who are determined, if possible, to prevent for the future what they consider the desecration of that noble scene, and a company has been formed for the purpose of acquiring at a reasonable valuation the territory bordering the Falls on the Canadian side, removing unsightly structures and putting the ground in good order to be held as a pleasure resort. The company, if an act of incorporation is granted it, will erect suitable and necessary buildings, and charge visitors a reasonable admission fee. It is much to be hoped that this company might find its prospects of financial success so encouraging as to induce it to obtain authority for taking land on the American as well as the other side of the river. There can certainly be no objection to the charging of an admission fee which would repay the cost of preserving the world-renowned cataract of Niagara from being hidden by vile sheds, and we are inclined to think that the number of visitors would increase rather than diminish if the vicinity of the falls were once cleared of the annoying objects which now encumber it.

A little light is thrown upon the mystery of the Keely motor by the text of the caveat filed in the United States Patent Office to protect his claim. According to this document, Mr. Keely's invention consists in "an improvement in a new force and machinery for the evolution thereof, and its utilization as a motive power for the propulsion of machinery, for the firing of guns, etc." The full description of the invention is placed in the confidential archives of the Patent Office, where neither the stockholders of the Motor Company nor any one else can get at it, and there it is very likely to remain, as the caveat can be renewed indefinitely. Meanwhile, it is at least permitted to indulge in a little speculation in regard to the nature of the force which is "evolved by machinery," and is used "for the propulsion of machinery." To most persons the thought would naturally occur that a force so produced and so applied would be usefully employed in propelling the machinery by which it was itself evolved, and the renowned motor would then resolve itself simply into a perpetual-motion machine, not very different, except in its enormous cost, from the scores of others which crowd the shelves of the Patent Office Museum. It is true that no perpetual-motion machine hitherto has been applied to the firing of guns, but if, as some suppose, Mr. Keely's invention consists simply in an apparatus for compressing air, and transmitting it to machinery at a little distance, there is no reason why the force so obtained should not be used by means of sudden expansion in a gun-barrel.

At last accounts, the suit of Mr. Belt, the sculptor, against one of the London journals, for libel in denying his artistic capacity, is likely to be decided in favor of the plaintiff, if indeed anything can be called a favorable decision which involves the payment of fees amounting, it is said, to about seventy-five thousand dollars. Mr. Belt, as was expected, brought his materials into court and produced a bust for the edification of the jury, and although the sculpture was pronounced by all the expert witnesses to be very bad, it must have produced an impression on the audience. Another point was made for Mr. Belt during the testimony of Sir Frederick Leighton, the President of the Royal Academy. Every one remembers that Sir Frederick, although a painter by profession, exhibited not long ago a brilliant piece of sculpture, and Mr. Belt's counsel, after hearing his testimony that his client was an ignorant deceiver, suddenly retaliated by asking him whether his own statue was entirely the work of his hands, and by ingenious cross-questioning forced him to admit that he had been obliged to employ assistance. We may be sure that Sir Frederick Leighton's assistants did not work at night, or disappear through trap-doors when visitors were announced; but that view of the question was kept judiciously in the background. On the whole, it is worth remembering that however ridiculous Mr. Belt may have been made to appear, the dispute which the court is called upon to decide is not whether he is or is not a first-rate artist, but whether he is a sufficiently good one to be entitled to protection against the attempts of a certain newspaper to drive him out of the profession entirely, by destroying his chance of making an honest living in it; and most persons including, we imagine, the jury in the case, will think that, considering the quality of much of the art which finds a market, a sculptor's methods must be very objectionable to make him a lawful prey to any newspaper which may find profit, not in criticising his works, but in systematic endeavors to ruin him.

The well-known Dr. Christopher Dresser not long ago made a visit to Japan, to study the peculiarities of decoration in that country, and has published an account of his experiences which must, to judge from a review of it in the *Builder*, be very interesting. Not to speak of the various comments which the author makes upon the painting and architecture of the Japanese in general, his description of a certain piece of construction which he examined is curious enough to repeat. The building in question was a pagoda, one of those towers whose outline is so familiar to us from pictures; and Dr. Dresser was surprised on entering it to find it supported by a mass of timber framing. In the centre, particularly, was a vertical timber, two feet square, which extended to the top, and was stiffened for a certain distance from the bottom by two similar timbers bolted to its side. This seeming to him a foolish waste of material, he complained to a native friend who was with him, and was told that the framing of the sides held up the central timber, instead of being held up by it, as he imagined, and on further inspection he discovered that the middle shaft was suspended clear of the ground, like an immense pendulum, and served simply to maintain the balance of the tower during earthquakes, which are very common in Japan. It is not quite clear how such a swinging weight could do much to preserve or restore the equilibrium of the pagoda during a series of vibrations, at least in any other way than by lowering the centre of gravity to some extent; but the idea seems to be quite original, and might some time prove useful in structures for a different purpose.

Another ancient mansion in the West of England, Clevedon Court in Somersetshire, was recently destroyed by fire, and with it furniture and books of great value. Some portions of Clevedon were of great antiquity, the original structure having been founded under Edward II, but remodelled during the reign of Elizabeth, and altered in various ways since. One of the rooms contained a beautiful chimney-piece of the Elizabethan period, and near the house was the ancient conventual church of St. Andrew, always associated with the history of the manor. The place belonged to the Elton family, who came into possession of it at the beginning of the eighteenth century.

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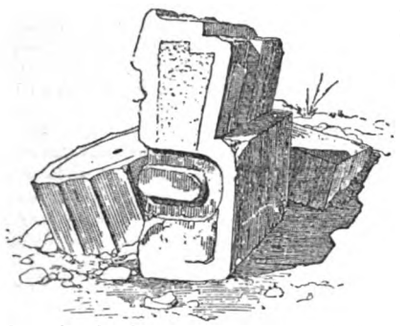
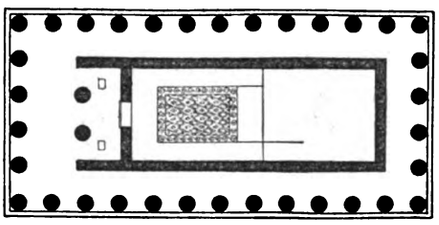
THE EXPLORATIONS AT ASSOS.[1]—II.



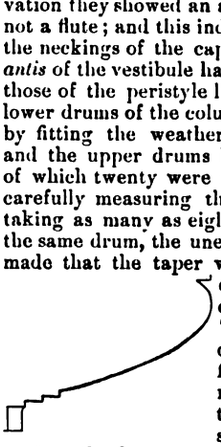
THE temple is built of the trachyte of the neighborhood, a rough, hard stone which would not have lent itself to very delicate cutting, but whose hardness has preserved its shapes in their freshness. The natural rock of the acropolis is its foundation, roughly levelled, so that in part it forms a bed for the pavement of the temple or receives directly the lower step of the platform. At some points its inequalities are levelled up with coursed rubble to carry the steps. It is likely that the rough stone was covered with a thin facing or priming of stucco which the Greeks commonly used on rough material. Of this Mr. Clarke sees evidence in the grayish dust which he noticed in the chinks of the pavement, but naturally the weathering of twenty-two or three centuries has worn it away.

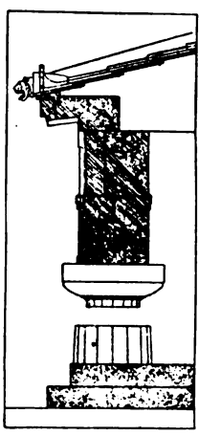
The building was small, its stylobate, surrounded by only two steps instead of the usual three, being about forty-six feet by one hundred. The whole height of the order was twenty-four feet, and the height of the columns fifteen and a half. These are very nearly the dimensions of the Theseum at Athens, with which, as we shall continue to see, the temple has striking analogies. It was hexastyle peripteral, with thirteen columns on the flank —in this, too, like the Theseum. The explorers found absolutely nothing in position above the platform, but this was in very good preservation and fortunately retained clear indications of the plan of the building which had stood upon it. The upper step had been torn away from either end, but elsewhere was nearly perfect. A great part of the pavement of the peristyle remains, and some fragments of that of the cella. The risers of the lower step still show the rough lugs like those that Hittorff found at Segeste, which were used, it is assumed, to hoist the stones by; and a raised margin, such as has also been found elsewhere, may have been meant to guard the joints from spawling—curious survivals which become a greater puzzle as we find them more and more common in Greek architecture, and are dismissed by Mr. Clarke with the off-hand remark that the obliteration of them was contrary to the spirit of Greek workmanship.



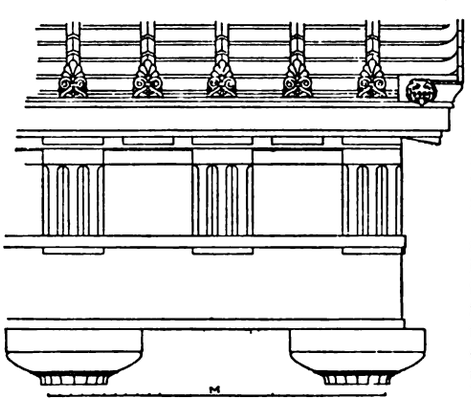
The platform when laid bare, was found to be paved outside the cella with rectangular slabs of stone, the bed for which was the roughly-levelled surface of the natural rock, its depressions levelled up with stone chips. The slabs, usually laid with random lengths in bands, were in some places laid irregularly, and curiously joggled together. This pavement, says Mr. Clarke, was half an inch lower than the upper step which formed its curb, and in which stood the colonnade, as if it had been covered with a coating of cement, but it is only in the north aisle that his plan shows a straight margin, against which this cement could have stopped. The account of the indications from which the plan of the building was deduced illustrates the care and keenness of the explorers. When the upper step had been carefully washed, the slight traces of weathering on the surface of the stone betrayed the position of the columns. The portions covered by the feet of the shafts had been protected by them long enough to be left in very faint relief which could be clearly made out only in the low light of the setting or the rising sun, or by artificial light on a dark night. By these helps the outlines of even the flutings could be seen wherever the step was left, and in this way the position of ten columns on the north flank and eight on the south were recognized.

The position of the cella walls was marked by a delicate line incised upon the pavement which had evidently been used in place of a stretched cord or chalk-line for laying out the work. Two mortises marked the places where the door-jambs had stood, and the positions of the antæ and the cross wall were clear, while the faint traces of the two columns *in antis* of the cella were left by the weathering. There was evidently no door in the rear of the cella, and no indication of any division in it, so that the interior of the cella lacked even a posticum and must have been a single room. Part of the floor of this room was revealed in two diagonally opposite corners of a mosaic pavement of black and white marble in cubical *tesseræ*, of a lozenge-like diaper pattern bordered by a wave ornament. It covered, apparently, the space reserved for adoration in front of the statue which the temple must have contained. Two small sinkages in the pavement of the pronaos, or vestibule, probably mark the positions of *cippi*, or pedestals, small enough to need the support of a socket, monuments such as it was customary to set in front of Greek temples, though commonly not within the vestibule itself. Above the platform the construction had to be made out by inference. Fortunately material was found for determining almost all the essential parts of the building, and the care and precision of the explorers make their inferences very trustworthy. A great many drums of columns were found and several hundred measurements of them were made that the investigators might be fully satisfied with their conclusions. The weatherings on the upper step and between the *antæ* of the vestibule proved a striking anomaly in the placing of the columns. They were all set so that in elevation they showed an arris in the centre, and not a flute; and this indication was verified by the neckings of the capitals. The columns *in antis* of the vestibule had eighteen flutes, while those of the peristyle had only sixteen. The lower drums of the columns could be identified by fitting the weatherings on the platform, and the upper drums by fitting the capitals, of which twenty were found on the site. By carefully measuring the intermediate drums, taking as many as eight measurements from the same drum, the unexpected discovery was made that the taper was uniform in all the drums; that is, that the columns had no entasis. There was a single incised necking, and three flat reveals made the annulets at the bottom of the capital; the flutes stopping squarely against the lower one. "The outline of the echinus," says Mr. Clarke, "is of great vigor and beauty," but Mr. Clarke's drawing belies him, and if we may trust that, we must frankly call it clumsy and cushion-like, what a French artist would call *mou*.





We spoke in our preceding article of the extraordinary restoration in which Texier set his sculptures in the architrave of this temple, in defiance of all known precedent, and to the scandal of French architects. We had expected to find Mr. Clarke upsetting this restoration, and he himself had supposed it to be an error, but as we have seen, his examination has fully confirmed it. He has, however, discovered here a singular anomaly in construction. The architrave, though comparatively small, being only thirty-two inches on the soffit, and of equal height, is built in three blocks, or slabs, on edge. These are put together in a very surprising way, if we trust Mr. Clarke's restoration of the entablature. The middle block is let into the outside blocks, which are roughly rebated for it and meet above it, enclosing it on three sides. It is difficult to explain this whimsical, laborious, and extravagant method of construction; unless, indeed, Mr. Clarke has taken an accidental peculiarity of a few stones for the rule of construction, which hardly seems likely. The other marked peculiarity of the order is that although the usual regulæ are found under the triglyphs there are no guttæ upon them nor upon the mutules.



This odd characteristic might, if the date of the temple could be fixed with certainty, prove to be of consequence in the history of the Doric style. Mr. Clarke, who, as we saw, assigns the temple to the culminating period of Greek architecture, passes very lightly over this point. It is worth remembering that the importance of the temple at Assos depends on its antiquity. If it can be shown to be very old, dating, for instance, from the time of the greatness of Assos under Crœsus; or if the unparalleled peculiarities of its order are survivals of a primitive Doric, then it throws a valuable light on the development of the style. But the idea of a survival is not tenable in the absence of other examples; and if we have here only the chance tricks of a provincial architect at the time when the perfected type of Doric temple was taking shape in the Theseum, then the building, standing in an eddy outside the current of development, though still curious has lost its historic importance, and its peculiarities are as unsignificant as they are forbidding. The rake of the pediment cornice was given by one of the corner blocks of the corona; another block gave its junction with the tympanum. A bit of a corner gutter was also found, — or at

[1] Papers of the Archæological Institute of America, Classical Series. — I. Report on the Investigations at Assos, 1881. By Joseph Thacher Clarke. With an Appendix containing Inscriptions from Assos and Lesbos, and Papers by W. C. Lawton and J. S. Diller. Printed at the Cost of the Harvard Art Club and the Harvard Philological Society. Boston: A. Williams & Co. London: N. Trübner & Co., 1882.

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least the lion's head which served as gargoyle for it. This head, whose carving Mr. Clarke praises, was of finer and softer stone than the rest of the building. Fragments of the flat tiles of the roof were found, and also one antefix. Tiles and antefix were of terra-cotta, glazed with black, the antefix painted in black and red. There was nothing to show how the peristyle had been ceiled, though Mr. Clarke had noticed, high up in the wall of a mediæval tower, a coffered stone which may possibly have covered one of its *lacunæ*.

"The bed-mouldings shown by Texier," says Mr. Clarke, "are wholly imaginary." Not only were none of them found, but the corner blocks of the corona indicated that there had been none.

The methods of construction used, except the singular bonding of the architrave which we have already noticed, were such as we have been accustomed to find in Greek buildings. The triglyphs were rebated for the metopes. The stones of the steps had been bonded with iron cramps with lead run in. Here, and apparently in other places, where there was opportunity, the bonding was quite irregular. On the soffits of the architrave at the ends of the blocks were holes, probably where the lintels had been dowelled to the abaci of the capitals. The upper and lower beds of the shafts showed slots in which were doubtless set the pegs on which the drums were turned in a lathe, while in the intermediate beds were holes for round pegs of an inch and three-quarters diameter on which the drums could be revolved and ground together till the beds were perfectly fitted. Here, however, as in the joints of the entablature, the bearing is only for about four inches from the face of the stone, the rest of the joint being worked free, with no bearing whatever — one of the common tricks of Greek constructors, and safe in their low buildings; but which modern builders have imitated with great disaster. The stones of the corona showed in the vertical joints the U-shaped channels which are seen in some of the Sicilian temples and at Ægina, and are assumed to have held the ropes by which the stones were swung into place.

The analogy in arrangement and dimensions to the Theseum is striking, as Mr. Clarke points out, and the dimensions are also nearly those of the temple at Ægina. The mere similarity of measures is, however, less significant than it looks; for the consecrated unit of a hundred feet being assumed for the length of a hexastyle temple, the other dimensions at any one period of the style would follow very nearly as a matter of course. From the probable assumption that the platform of the temple was meant to be a hundred feet, Mr. Clarke attacks, like other authors, the problem of the Greek foot, and finds a value very near those that have been found by Boeckh and others. It is, perhaps, not necessary to assume that the foot in various states and colonies of Greece and in various ages, was kept more invariable than in different countries of Europe in later times. It is by reasoning chiefly from the analogy of plan and considering the archaic character of the order of less significance, that Mr. Clarke assigns the building of the temple at Assos to the time immediately after the Greek invasion of Xerxes, and makes it contemporary with the Theseum. It should not be forgotten that in old times geographical remoteness would offset a considerable difference in age. The difference between the primitive architecture of St. Front at Périgueux and its finished-looking prototype in St. Mark's at Venice, is a striking analogy. Nevertheless, when we set the elevation of the Assos temple, as Mr. Clarke gives it, beside that of the Theseum, and note the primitive look of its straight-sided columns with their few flutings and their pronounced taper, the bulging capitals, the mutules and regulæ without guttæ, the generally coarse execution of the work, and above all the prevailing rudeness of the sculpture, it is hard to imagine the two buildings going up together, only two hundred miles apart,— two days' sailing across a sea crowded with the busy ships of Greece and her colonies.

For the sake of easy comparison we will give roundly the leading dimensions in mass and details of the three temples which Mr. Clarke considers contemporary, but which in point of style, show great differences.

	Assos.	Ægina.	Theseum.
Size of Platform	46′ x 100′	45′ x 94′	45′ x 104′
" Cella	26′ x 73′	20′ 6″ x 42″ (75)	26′ 6″ x 73′
Width of Peristyle	9′ 9″	12′	9′ 6″
Height of Order	22′	24′	25′
" Entablature	6′ 6″	6′ 9″	6′ 4″
" Columns	15′ 6″	17′ 3″	18′ 8″
Diameter "	3′	3′ 2″	3′ 3″
Height of Shafts in Diameters	5½	5½	5½

We may notice here that there is evidently a mistake in Mr. Clarke's tabulation of the Assos temple (p. 97), for he gives the full height of the order as twenty-four feet, (7.36 metres), while the parts of which it is composed sum up only a little over twenty-two feet (6.8 metres). The last figure, which suits the elevation, is probably the correct one. We find also some embarrassment in tracing out the *provenance* of the different blocks in Mr. Clarke's plan, plate 2, because on pp. 33 and 34, he has said northwest where he evidently means northeast, and northeast where he means northwest. While the dimensions of the plans are nearly the same, as we have said, in the three buildings, those of the order show a progressive advance toward the proportions of the time of Pericles. In the character of the details, the differences and the progress are much more marked. An advance is visible from Ægina to the Theseum, though the two buildings are generally conceded to be almost contemporary, but the gap between Assos and Ægina is far greater. Apart from the rudeness of their workmanship, the details of Assos are, in their archaic quality, behind those of Agrigentum, the great temple at Pæstum, and most of the temples at Selinus. The great temple at Selinus contains in its modifications, undertaken, argues Hittorff, at periods wide apart, an epitome of these different changes. Its plan, which necessarily belongs to its earliest epoch, has substantially the same alignment of columns which, in Mr. Clarke's view, allies Assos to the Theseum, but its older work is markedly archaic, having the extremely tapering shafts, the swelling echinus and deep scotia under it, with other signs of very early Doric, while the columns of the posticum are as developed as those of Ægina. The unravelling of the history of either this temple or that at Assos might throw light on the other. The same question comes up,—how much of these differences is due to provincialism and how much to age. But we shall be wise to leave these questions to archæologists.

SUNDRY WORKING-DRAWINGS.[1]— II.

I SOON got to love these modest Monmouthshire churches, discovering that their extreme simplicity was completely in harmony with their surroundings, and preferable there to the comparatively greater pretentiousness of modern work generally, and even old work in richer districts elsewhere. I have often in consequence attempted to work on the same general lines under similar circumstances, particularly in cases where commissions have been linked to like cautions as to there being but little money to expend; and though the working-drawings of such structures may look somewhat bare and uninteresting, one often has the satisfaction of finding the result not altogether as bald as had been feared.

Now, the normal condition of these churches was that their roofs had become decayed, their pins had drawn, and the ties from wall to wall generally removed altogether. The walls had consequently yielded to the outward pressure of the roof, and having been originally built with mortar made with the loamy sand, the only material of that nature formerly procurable in the county, the lime had been killed, and the mortar had become little better than dust. They were usually rent at all the angles and elsewhere, and were in such a condition that a vigorous push would have overturned them. The general character of the roofs of these churches was that known as half-barrel or wagon-shaped; that is, constructed of framed and braced couples, without principals or purlins. The braces were usually curved, and served as cradling for boarded ceilings of segmental, semicircular, or slightly pointed form, and were decorated beneath with moulded ribs, with carved bosses at the intersections, and there were usually moulded cornices of considerable depth. Most of these churches had doubtless once had massive tie-beams spanning from the opposite wall-plates, which had in course of time become decayed at the ends, and been removed and no others replaced; hence the perilous condition into which the whole of these structures had fallen.

Some of these roofs had certain of the pairs of couples wider and deeper than the rest, to serve as principals; these were moulded on the underside and carried moulded purlins. A good example of this class of roof exists at St. Lythan's, in the county of Glamorgan. It was not ceiled, but may have been intended to have been so, panel-wise, between the purlins. I remember admiring the refined effect of this particular specimen, which had somewhat peculiarly curved but elegant braces, so much that I followed its type in designing a new roof for the chancel of Lampeter Velfry, in Pembrokeshire. Another interesting roof existed in the last stage of decay at Oldcastle, in Monmouthshire. As it was absolutely necessary entirely to renew this, I reproduced the general character of the old principals, which were peculiar in form. This was an example of an open roof with principals and purlins. The collar was very high up, and arched braces supported it and connected it well with the principal rafters.

There are now so many different theories on the subject of restoration that I cannot hope to have satisfied all. Mine, then, was to replace matters as nearly as possible as I found them; and I have considered it a compliment when I have been told, as I was by the late Sir John Harding in connection with the restoration of Rockfield Church in Monmouthshire, that had he not been informed he should not have known that anything had been done to it. I was but recently told, however, by a zealous member of the Society for the Protection of Ancient Buildings, that I am only one of the more destructive members of my craft in consequence of the confusion thus wrought for future archæologists. There are in truth so many and grave questions that continually arise in dealings with old buildings,

[1] By J. P. Seddon. Paper read at the meeting of the Architectural Association, November 24, 1882.

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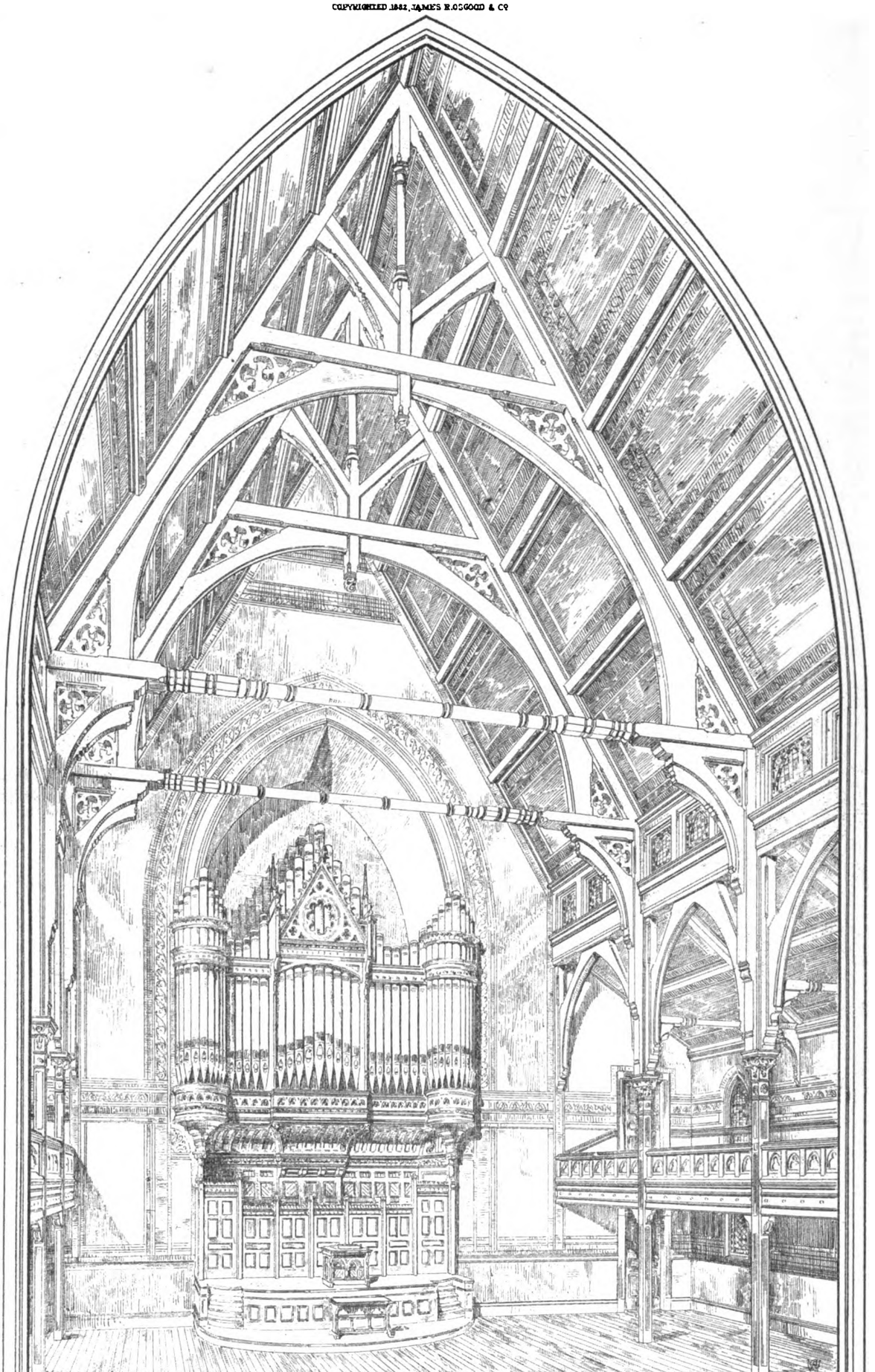

First Baptist Church Central Square Cambridge Interior

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PLATE XIX. SHADOWS BY GAS LIGHT. Fig. 85.

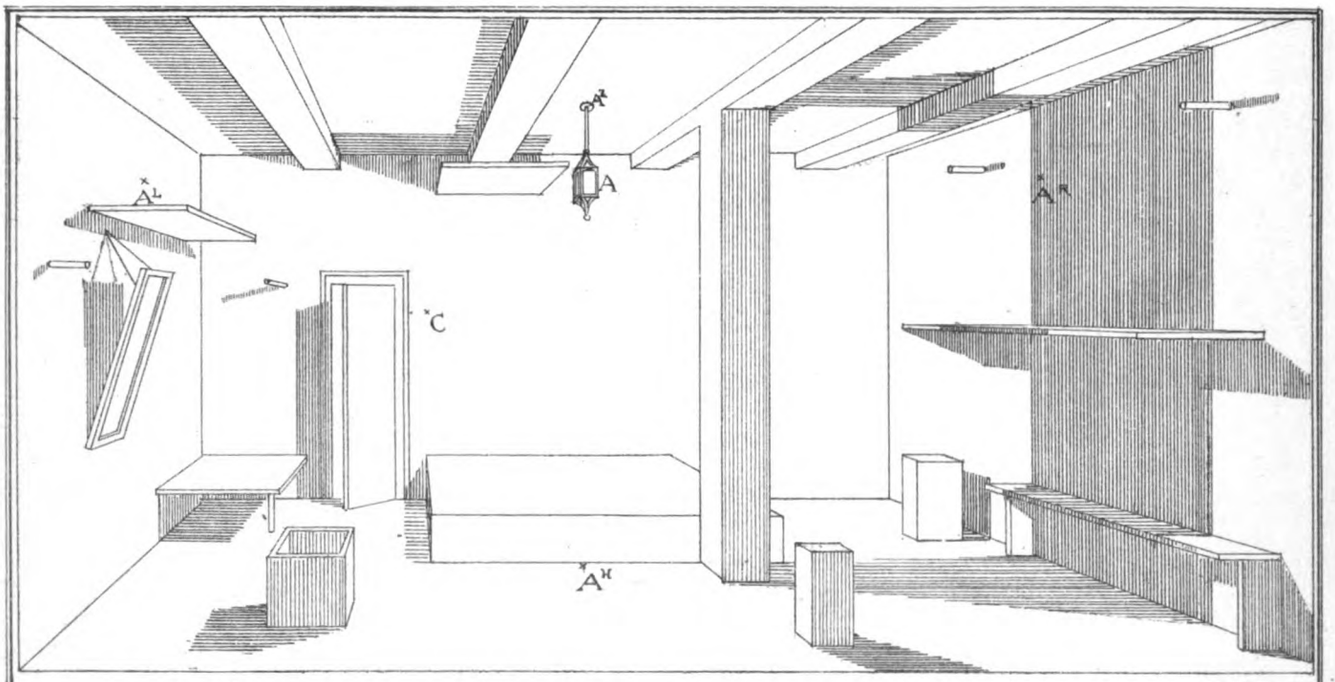


Fig. 86.

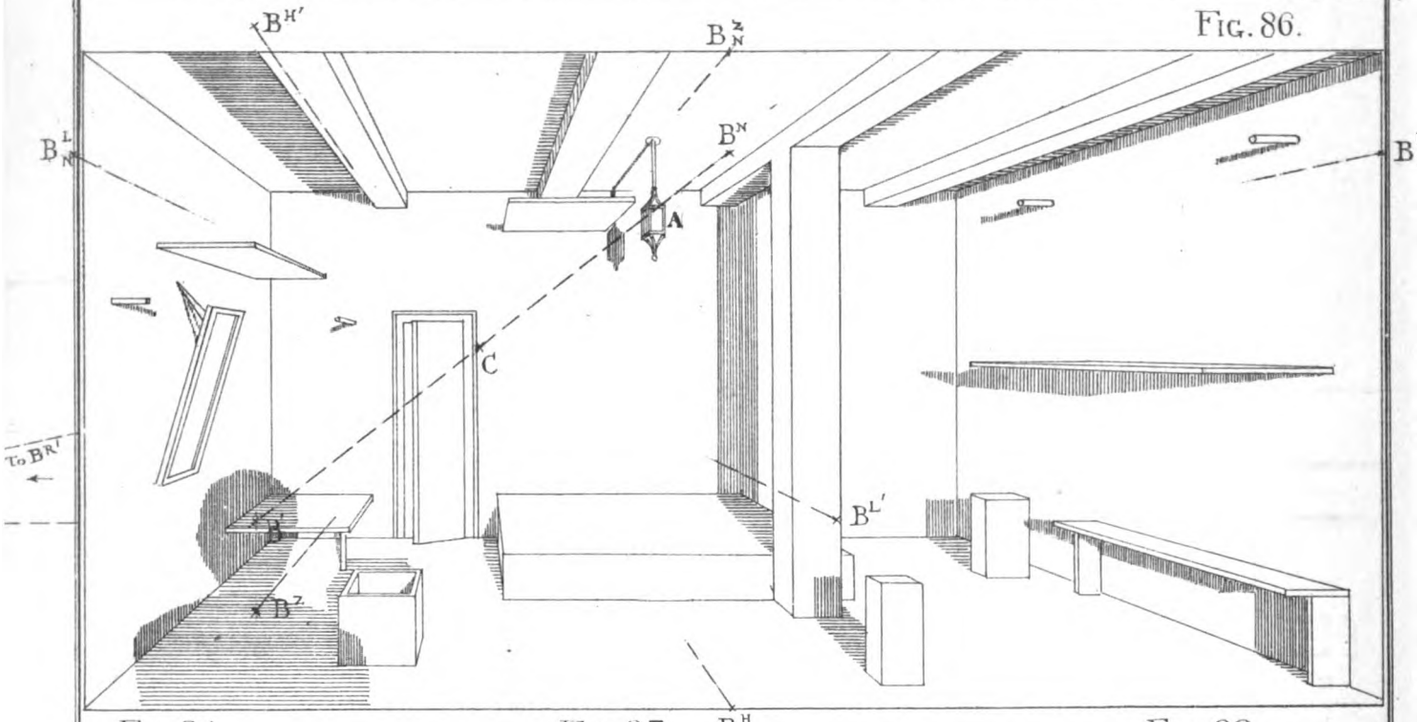
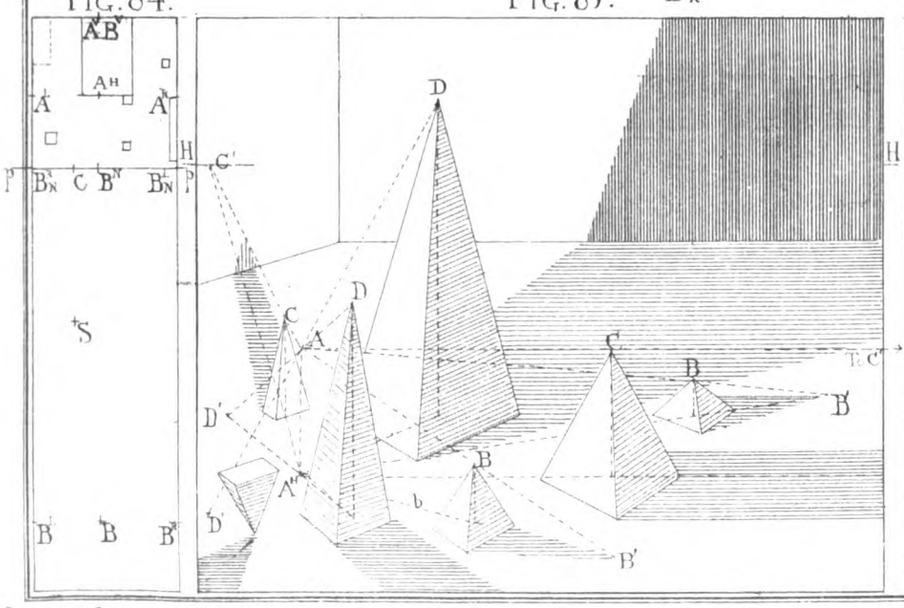
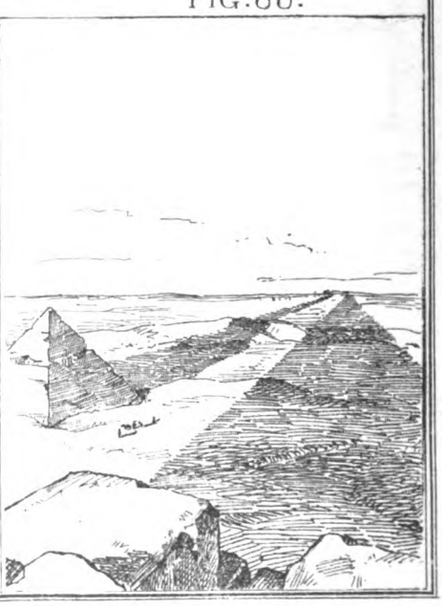


Fig. 84. Fig. 87. Fig. 88.





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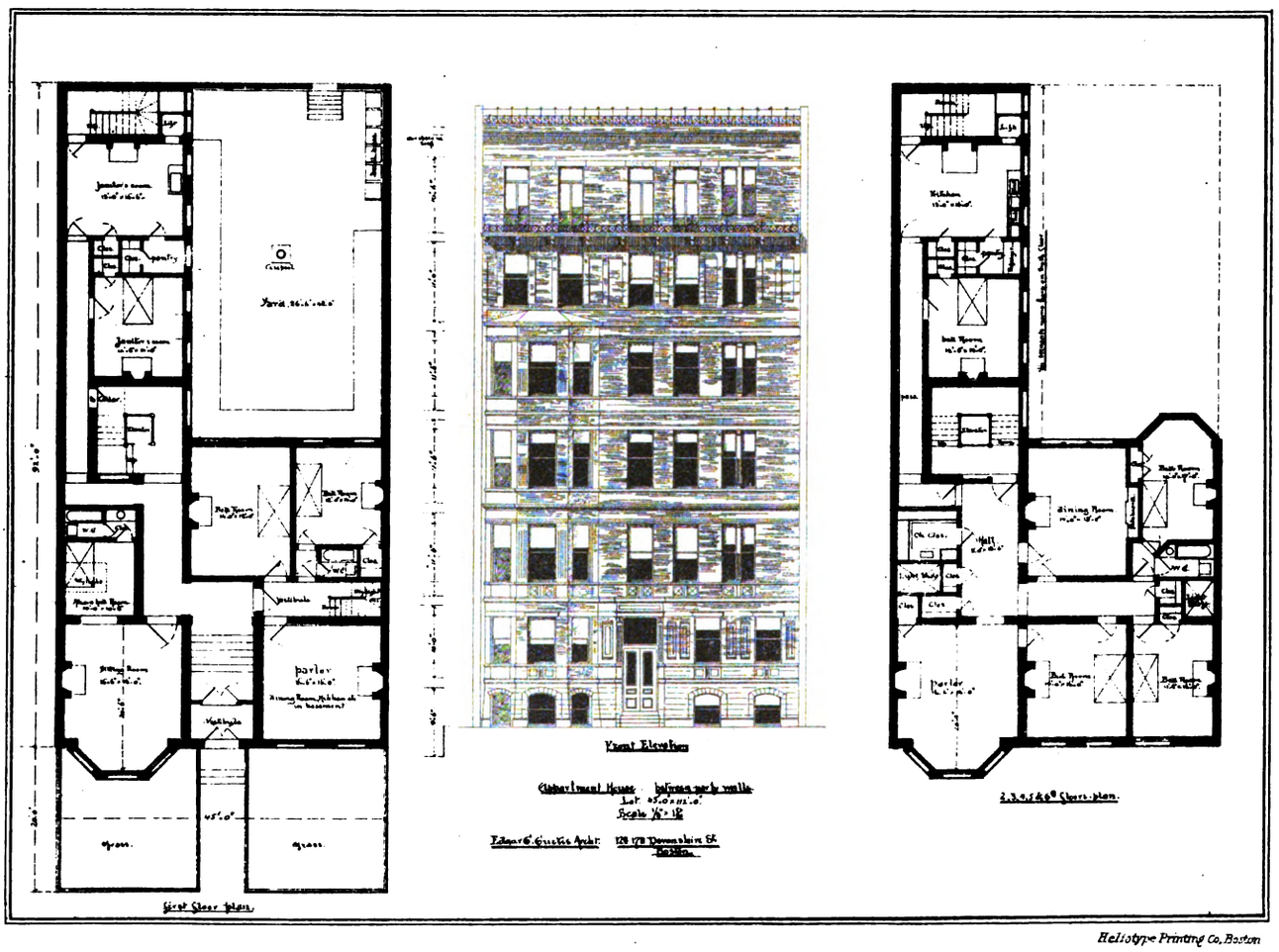
Country House near Philadelphia

HAZLEHURST & HUCKEL
ARCHITECTS, PHILA.



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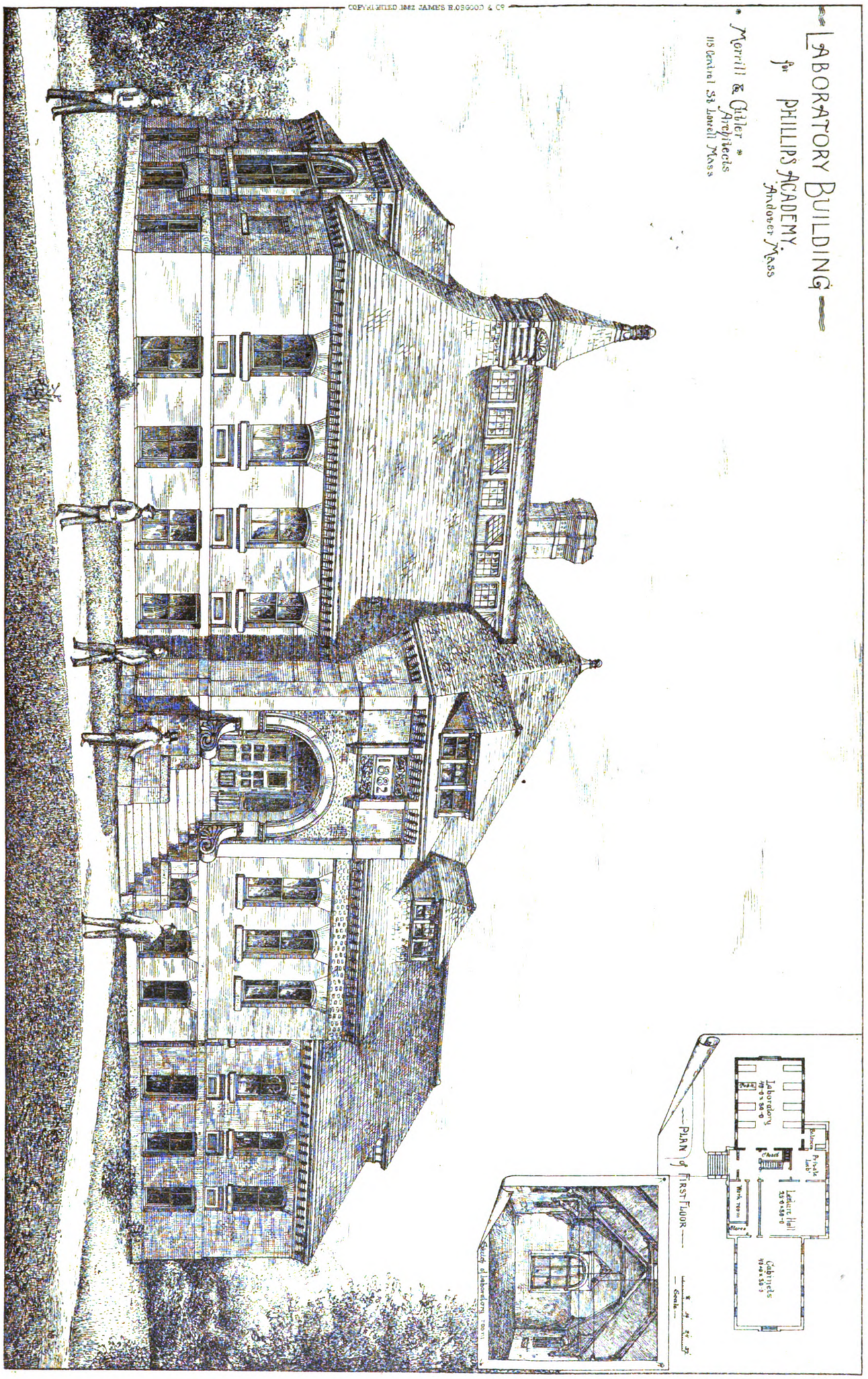

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and so many ways in which each of these may be viewed, that an architect's position in relation to such matters is a difficult one. He has to decide what should be done, and that with certainty that, whatever his decision may be, it will please few and be disputed by some. His only consolation is, that if his censors be asked how they would have acted under the circumstances, they would either have done nothing, which he was not in a position to do, or that each would have done something different to the rest; so that therefore their criticisms neutralize one another. In self-defence I can certainly aver that these village churches then stood, as it were, on their last legs, and that the newly-arisen zeal of the Church would not brook their total loss. After all, an architect is but the servant of the public, and though he may be able to, and if so should, influence the opinion of his employers, he is bound to defer to that in the end.

I have referred above to the subject of roof tie-beams, the essential necessity of which our forefathers frankly accepted, as was their wont, and tried to make the best of. The modern mind, however, seems to abhor ties, and one of the problems that I have continually had to endeavor to solve has been how to construct church roofs without any visible ties, and that often to cover walls of less than mediæval thickness, and of more than ordinary spans. In Kent and some other of the southeastern counties half-barrel-shaped roofs are not infrequent, but they are generally provided with efficient supports in the shape of tie-beams with king-posts and braces. There is one of early date, well moulded, at Salmestone Grange, near Margate. At Eythorne, near Dover, I succeeded in reproducing all these features in the new roofs, which I found it was absolutely necessary to substitute for old decayed ones. But at Great Kimbale, in Buckinghamshire, where I put a similar roof to the chancel of the parish church, it is even now in contemplation to cut away and dispense with the obnoxious tie-beam and king-post, because it happens, from some points of view, to appear to cross the upper part of the eastern window. This leads me to notice and to utter a protest, however unavailing it may be, against the absurd modern craze for an undisturbed vista from one end to another of our cathedrals and churches. All mystery and effect is thus sacrificed, and the interiors of our ecclesiastical buildings become as bald and bare as those of barns.

In the church of Great Kimbale, to which I have alluded, I met with the worst example in my experience of walls having been thrust outwards by the spreading of their roofs, but I succeeded in restoring them bodily to their proper upright position, without having them rebuilt, as at first appeared necessary. This I was able to accomplish by the simple expedient of having them hauled up by ropes attached to windlasses outside passing through the opposite openings, after having previously disengaged the bases of the several columns of the arcades, and subsequently underpinning them.

It is noticeable that all these old church roofs were constructed, however rudely, in oak, and that they have owed their duration to the extreme tenacity of that timber, in spite of all the adverse circumstances to which I have called attention. They have in very many cases been renewed or altered at a far later date than the ages of good church architecture, probably in rude imitation of the former ones, but with inferior construction; or perhaps the timbers of the old roofs had become decayed at their feet only from contact with the damp walling, and their ends having been cut off, they have been re-used and reframed, and so made to do duty again for a roof of lower pitch than the original. This may generally be discovered by finding the marks of the previous roof against a tower or the end gabling, and I lately found this to have been the case at the parish church at Betchworth, in the county of Surrey. In this case, also, disused and displaced mortise-holes betrayed the fact, together with the construction being inferior to any real mediæval work, the struts having been only nailed to, and not housed into the rafters and collars. The roof had been covered with exceedingly heavy stone slabbing, which had been improperly bedded completely in mortar, which by capillary attraction had rotted the lathings of the tiling and the ceiling between the rafters; these, again, being too close to each other, had left but little intermediate air-space (another frequent cause of similar disaster.) The roof timbers had in consequence sunk under their weight, and become dislocated at their points of junction, and the walls had yielded to their pressure, and so the complete restoration of the whole had become imperative.

The present almost prohibitive cost of oak, and difficulty of getting it seasoned, import another element for consideration into this already sufficiently vexed question of restoration; for the character of construction, what was suitable to that denser material is not so when fir has to be used instead. As an example, therefore, of the manner in which I have endeavored to solve this problem in connection with that of the non-toleration of ties, I may call your attention to the working-drawings which I have just prepared for this particular case at Betchworth. In the first place, I relinquished the use of the framed couples alone, which I consider is only desirable when oak can be obtained. For this treatment I have substituted one in which principals are introduced at moderate distances apart; and, to avoid the intrusion of ties, I have had to place the collars high up. I have made continuous curved braces to sustain them, and by connecting them thoroughly to the principal rafters reduced their thrust to a minimum.

I find, however, in looking over my folios, that in general I seem to have preferred to adopt, whenever I could, roofs with half-barrel-shaped ceilings rather than those left open to the ridge, as in the last case described. The reason is, that I consider the former the better adapted to maintain an equable temperature within buildings, and to give greater facilities for ventilation by means of the space that is left in them between their outer covering and the ceiling below the collars and braces, and also that they transmit better to a distance the sound of the voice. Then, again, the distance between the covering and ceiling gets rid of the danger of dry-rot, already spoken of as very likely to occur when the covering is of tiles bedded in mortar or cement, and there is but little space for air between it and the ceiling, which, if of plaster, is impervious, whether this be between or below the rafters themselves.

And yet the outer covering of roofs should be made impervious, or else it is of but little use to attempt to warm by artificial means the interior of a church. With the ordinary coverings used for the sake of economy, the heat evaporates through them almost as fast as it is generated, and the air of the interior, getting rapidly cooled by contact with the cold covering, descends, and causes the draughts so bitterly complained of by congregations. The least that ought to be done is to cover the rafters with stout boarding, ploughed and tongued, with asphalted felt laid upon it, and above them battens about 2 inches by 2 inches should be placed diagonally to brace the whole roof, and to allow any rain driven in under the tiles or slates to pass down to the eaves. The tiling or slating battens should be fixed upon these. I should even advise the boarding to be doubled, and to have plain felt between the two thicknesses, as well as the asphalted felt above them. Then the outer covering can be laid, as it should be, without mortar or cement.

The construction of this class of roof will be that in which principals are used with purlins to support the rafters, and cradling to carry the ceiling; and I shall call your attention to the working-drawings of several of such roofs in connection with some of the buildings I am about to mention.

At Great Yarmouth I have had considerable experience in connection with half-barrel-shaped ceiled roofs of large spans. It was in the year 1862 that I received the commission to undertake the restoration of the noble Church of St. Nicholas in that town. This, as you are doubtless aware, is one of the largest, if not the largest, simple parish churches in existence. The special peculiarity of it is that all its aisles have the immense internal width of about 40 feet. This commission was the more gratifying to me as I had been entirely unacquainted with the place and its inhabitants until I was informed that the committee had decided upon offering the work to me. I mention this fact because, although for very many years my relations with this work were of the pleasantest, and I was permitted to control all that was done at the church, in order that one mind might guide the whole, after a time that rule became relaxed, and I resigned in consequence. I am glad, however, to learn that it has lately fallen into the able hands of Mr. Pearson, under whom I trust that the work may be satisfactorily completed.

Some of the roofs and walls had fallen into a similar state of dilapidation to what I have been describing in other cases, and from the like causes. The first of the roofs that I had to replace there was that of the chancel, which has a span of only 25 feet. For this it was desired that I should, and I was able to, follow the old construction of framed couples, and employ the same material as before —that of oak. But when, later on, I had to undertake that of the vast south aisle of the nave, I found that practically neither were admissible, nor could I venture to introduce there any ties, as there had not previously been any. I therefore worked out the problem afresh, with fir for the material, and with principals and purlins and cradling for the ceiling, the result of which was entirely successful.

This church of St. Nicholas, though very impressive from its great scale, is not satisfactory, in that its nave and chancel are less in width than their respective aisles, the former having about 25 feet span, the latter 40 feet. In the new church dedicated to St. James, at the southern extremity of the same town, which is now in course of erection from my designs, I tried while keeping somewhat to the same scale, to correct this disproportion, and so make the width of the central compartment about 35 feet and that of the aisles 25 feet. The site that I had to deal with in this case was almost square, and I therefore adopted the Greek cross as the type for its plan. There are but four columns in the interior, and the central crux compartment is covered by a segmental dome of concrete carried by the four large arches and four smaller ones spanning the angles of the crux in place of pendentives. This it is my intention to have decorated with Rust's mosaic, as I have shown in a view of the interior of this church, which has been reduced by Messrs. Sprague, by their new photographic process, for the journal, *The Architect*, as an illustration to my paper in its pages, from a large colored drawing of it by my friend Mr. Howard Gaye. In the pulpit, seen in the drawing, I used the same material of mosaic in connection with decorative stoneware from the Fulham potteries, resting on a base of polished serpentine. Such materials, some specimens of which have been sent by Messrs. Belham for your inspection, I have found to give facilities for the introduction of constructional and durable colors into buildings, the want of which I had long previously felt and deplored. The interior of this church is lined with buff-colored brickwork diapered with red, and its exterior is likewise constructed with considerable variety of color in flint-work and red and black brickwork and stone dressings. The roofs are of the character of those described at St. Nicholas's; and indeed in the general size and scale of the

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parts I have tried to adapt in St. James's Church such of the characteristics of its mother-church as had impressed me with admiration, and had appeared to me to be desirable to introduce into the ecclesiastical architecture of our own time.

THE ILLUSTRATIONS.

DESIGN FOR LABORATORY BUILDING FOR PHILIPS ACADEMY, ANDOVER, MASS. MESSRS. MERRILL & CUTLER, ARCHITECTS, LOWELL, MASS.

THE left hand wing is already built. The whole is to be built of faced brick in red mortar with sandstone finish above the base-course which is of granite. The ventilation of the laboratory room is effected by means of seven Eureka ventilators in the walls; the sashes of the lantern are movable, being operated from the floor. Glass cases along the sides of the room are connected with ventilators in the roof by means of pipes laid in the brick walls to carry off the gases from chemical reactions. The remainder of the building is divided into lecture-room, private laboratory, balance-room, work-room, cabinet and store-room. The roof construction is open timbered.

APARTMENT-HOUSE BETWEEN PARTY WALLS. MR. EDWARD C. CURTIS, ARCHITECT, BOSTON, MASS.

These plans were drawn to show the feasibility of building a desirable apartment-house on other than a corner lot, and to illustrate it, a lot, 45′ x 112′, was selected as the most advantageous. On the first floor to left of front door is a large sitting-room with folding-doors to bed-room, etc., in rear, lighted and ventilated by skylight going through building. On the other side is a suite of rooms with dining-room, kitchen, etc., in basement, and janitor's quarters in rear. The building is provided with elevator and lift to all floors. On the second, third, fourth and fifth, we get a good suite of rooms with all the modern improvements. On sixth floor, in rear, are five or six servants' rooms for the various flats of the building. The servants' rooms diminish the sixth-floor flat, leaving a suite of rooms for a small family with kitchen, etc., in place of some of the other rooms.

COUNTRY HOUSE NEAR PHILADELPHIA, PA. MESSRS. HAZLEHURST & HUCKEL, ARCHITECTS, PHILADELPHIA, PA.

PERSPECTIVE DIAGRAMS. SHADOWS BY ARTIFICIAL LIGHT.

For description see succeeding article.

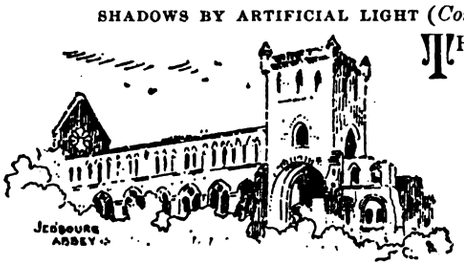
INTERIOR OF THE FIRST BAPTIST CHURCH, CAMBRIDGEPORT, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

The following description of the chapel of the Sisters of St. Margaret at Boston, published in our last issue, was unintentionally omitted: —

The stalls, which will accommodate sixty sisters, are returned at the west end against a rich open traceried screen which divides the chapel from the ante-chapel. Both stalls and screen are of oak. The reredos is a carved framing to five pictures, the central panel being the Crucifixion. The rood screen has to be stained and gilded. The floor at the east end has to be of cherry and maple laid in squares and diamonds. The roof and walls are to be decorated.

PAPERS ON PERSPECTIVE. — XVII.

SHADOWS BY ARTIFICIAL LIGHT (*Continued*).



THE most frequent examples of shadows cast by artificial light are presented in pictures of interiors lighted by candles or gas-light. It is customary to restrict the discussion of these phenomena to cases in which the source of light is, as in the figures already given, in front of the spectator. But the theory of false apexes explained in this chapter (301,) enables us to illustrate also the case, equally common in actual experience, in which the source of light is behind the spectator. Figures 85 and 86 illustrate these two cases. The shadows are cast by the method of Figure 81, *b* and *g*.

318. Figures 84 and 85, Plate XIX, represent the plan of a long room, and the perspective of one end of it. The line *pp*, in Figure 84, shows the position of the plane of the picture. S is the horizontal projection of the station point, and A and B the projections of two gas-burners suspended from the ceiling. The burner, A, appears in its proper position in Figure 85; its projection upon the floor is shown at A^H, upon the ceiling at A^Z, on the right and left hand walls, at A^R and A^L, and upon the rear wall, which is parallel with the plane of the picture, at A^P. These points are the points in each surface towards, or away from which the shadows of lines normal to these surfaces are directed when this burner is lighted (314). Each is an apex of the diverging visible shadows, while A is the apex of the diverging lines of invisible shadow. The extreme point of the visible shadow of the normal line is in each case determined by the line of the invisible shadow of the extreme point of that line.

In Figure 86 the other burner, B, is supposed to be lighted, and we have the case already illustrated in Figures 77 and 80, in which the apex of diverging lines is behind the spectator. Following the method of Figure 80, we find that lines drawn normal to the plane of the picture from these several apexes pierce the picture at the points B_N, B^H_N, B^Z_N, B^R_N, and B^L_N, and the false apexes B′, $B^{H\prime}$, $H^{Z\prime}$, $B^{R\prime}$, and $B^{L\prime}$, are then easily found.

B′ is determined by the aid of the plan, Figure 84, the line B_NC being the perspective of the ray normal to the picture, and the vertical line through *b* the perspective of the horizontal ray passing above the spectator. Their point of intersection, B′, is the false apex (303). It lies in the shadow of the spectator's head, just at the point occupied by his right eye, the eye with which he is supposed to be looking. This point is, then, in artificial light as well as in sunlight, the focus of rays of light proceeding from behind the spectator. Lines drawn in like manner from the points B^H_N, B^Z_N, etc., through the centre, C, will contain the other false apexes, and as the true apexes are either on a level with B or are directly above or below it, so the false apexes will be either on a level with B′ or directly below or above it; that is to say, they will lie in the intersection of the lines drawn through C, with horizontal or vertical lines drawn through B′.

319. It will be noticed that the apex B^P, towards which the shadows of the lines normal to the rear wall are directed, occupies the same position as the point A^P, towards which the shadows of the same lines were directed in Figure 85. The only difference in the two cases is that the shadows in Figure 86 are shorter than those in Figure 85, being cut off by lines converging to B′ instead of by lines converging to A; but they coincide with them as far as they go. A^P and A being near together, the lines directed towards them intersect a good way off, giving longer shadows than do the lines directed towards B^P and B′.

Indeed, there is much less of shadow altogether in Figure 86 than in Figure 85, as was to be expected, the spectator's eye being so nearly in a line with the source of light. If it could coincide with it, as was supposed to happen in the case of the serenader in Figure 83, he would see no shadows at all.

The shadow of the lantern, A, thrown upon the rear wall at A^P, or B^P, is really, of course, a little larger than the lantern, being at a greater distance from the apex, B. But its perspective is smaller than the perspective of the lantern, its distance from the station-point being relatively greater still. If the station-point were exactly on a line between the point B and the lantern, the outline of the shadow would obviously fall within that of the lantern itself.

320. The shadows of convergent lines, whether cast by natural or by artificial light, converge, of course, to the shadow of their apex. But if the apex is just as far from the plane on which the shadows fall as is the source of light, its shadows will be at an infinite distance, and the shadows of the converging lines will be parallel to one another and to the shadow of that element of the convergent system of lines which is normal to the plane, and will have the same vanishing-point in the trace of that plane; if it is farther off, they will diverge, being directed towards a point in the plane beyond the source of light. This point is, so to speak, the *negative* shadow of the apex, being still the point where the line through the apex of the lines and the apex of the rays pierces the plane. It is the same point that would be obtained if the two apexes should change places.

321. Figure 87 illustrates these points, showing the shadows of several geometrical figures cast upon the floor. The point A^H is the horizontal projection of the gas-light, A. The shadows of the lines which meet at the apex B, meet at its shadow, B′. The shadows of the vertical axis are directed upon A^H. The apexes C and C are just on a level with A; their shadows upon the table are accordingly at an infinite distance, and the shadows of the lines that meet at these apexes are accordingly parallel in space, and have their vanishing-points upon the horizon. Each point D is farther from the table than A, and the shadows of the edges of the pyramid of which it is the apex converge towards the corresponding point D′, the "negative shadow" of D, being the point upon the horizontal plane where the shadow of A would fall if D were a source of light.

In sunlight, also, the shadows of converging lines are parallel when the source of light is just as far as the apex from the plane on which the shadow is cast. Figure 88 shows how the Pyramids, at sunrise, throw parallel lines of shadow towards the Libyan desert.

The analogy of these phenomena of shadow to those of the perspective representation of converging lines (301, Fig. 77) recalls the analogy, already pointed out, between the shadows of all objects when cast upon a plane by artificial light, and their perspective representation (265, Fig. 60).

STAINING BRICKS. — For staining bricks red, melt one ounce of glue in one gallon of water; add a piece of alum the size of an egg, then one-half pound of Venetian red, and one pound of Spanish brown. Try the color on the bricks before using, and change light or dark with the red or brown, using a yellow mineral for buff. For coloring black, heat asphaltum to a fluid state, and moderately heat true surface bricks and dip them. Or make a hot mixture of linseed oil and asphalte; heat the bricks and dip them. Tar and asphalte are also used for the same purpose. It is important that the bricks be sufficiently hot, and be held in the mixture to absorb the color to the depth of one-sixteenth of an inch.

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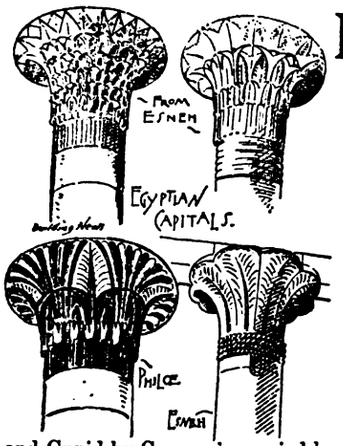
OLD MASTERS.

SAN FRANCISCO, CAL.



LOVERS of art, and especially those who imagine nothing is worthy of approval but the works of old masters, are now having a treat in the exhibition of the Nahl collection of originals and copies of works by Raphael, Rubens, Veronese, Poussin, Van Dyck, Correggio, Rembrandt, Coypel, Ruysdael, and many others, forming a very interesting collection, and as there are some eighty originals, the exhibition is one seldom equalled, for the public to judge of the respective merits of old and modern painters.

As to the copies in general, they are poorly and stiffly drawn, with the exception of a Venus and Cupid by Correggio, copied by J. W. Nahl, which is very good.

In general, it may be said of all the Nahls running back to a century ago, that their drawings are too set and coloring too heavy, much the same as the "Chinese white" water-color artists affect.

The most attractive painting is the Dance of Cupid, by Raphael. The figures of Cupid and four companions (one colored black), are well drawn and shaded, but if the catalogue did not kindly state that honey was flowing from an upset bowl in the foreground, one might think it was a bowl of hair as nearly as anything.

Another striking picture is the Slaughter of the Innocents, by Guido Reni. The subject is one naturally expected to attract attention, but the navel on one child is outrageously out of proportion, and what at first sight is a black cloud in the background, is, on close examination, a woman with a green-black face and drapery the same: a condition of things possibly peculiar to the female sex in the times of the old masters.

A most striking and disgusting picture is the Death of Cato, by Guiseppe Ribera. All the features are not only expressive of great pain caused by tearing open his wounds, but are beastly and coarse in the extreme, all showing a low and degraded spirit in the painter. The writer has, unfortunately, had many wounds, but none from which the blood did not run more than freely at less provocation than is shown in the above, but here, the blood obligingly stopped that the effect of the wrinkled flesh might be more prominent.

Two paintings by Georgione, The Nymph (more than life size) and Lucretia, are well drawn as regards the main figures, but all the adjuncts are poor, and the flesh tints all on a dirty green, and the same may be said of nearly all the paintings on exhibition.

The Quarrel of Philip of Macedon and Alexander the Great, by Donato Creti, has two main figures very finely drawn and colored, but accessories poor.

A head of an old man by Coypel, is a very fine piece of coloring, and indeed, the gems of the collection are portraits, the best by Teschbein. Three specimens by Rubens do not do that artist justice, especially the Weeping Magdalen, who has a bad hare-lip, and the whole face is overdrawn and colored.

The landscapes throughout, some by Poussin and Rembrandt, are all very poor and would rank as pot-boilers to-day. Two subjects by Veronese, Interment of Christ and St. Peter delivered from Prison, are poorly drawn.

The subjects in still life by Franz Snyders are well and boldly colored, and the same may be said of Van Lillenberg's.

In general, it may be said that the greatest impression one receives is that most of the paintings are all noticeable for the poor accessories and the general stiffness of figures and green flesh tints.

The Nahl collection is a large and varied one, but the paintings do not do justice to several of the more noted masters. Besides the paintings are many sketches and a copy in plaster of the frieze of the Parthenon at Athens, among which one could spend hours profitably.

Taken altogether, the exhibition is an enjoyable opportunity for lovers of art to judge of the merits of older work. S.

ARCHITECTS' RESPONSIBILITY FOR SANITARY DEFECTS.

NEW YORK, December 13, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I am moved to utter a word of expostulation, if not protest, against the omissions of architects in regard to sanitary requirements. In my daily experience as a sanitary engineer I am constantly impressed with the extent of these omissions, which are noticeable, not only in older buildings but in those erected within a few months, but at any rate since the general agitation of and public interest in sanitary matters. It is not to be expected that the best plumbing and drainage should be found in dwellings erected ten, fifteen, or twenty years ago, yet many of the worst cases of criminal carelessness and ignorance in plumbing work in my experience have been in buildings barely completed, and which were in charge of architects of the highest reputation and experience. The contrast between the handsome exterior, artistic decoration and rich furnishing of these dwellings, and their sanitary defects is so great as to fill one with amazement. I have just completed an examination of a house of this class which occupied several years in its construction, and which is a model of taste and elegance, though the drainage arrangements are wretchedly bad. The underground drains are pitched the wrong way, and not having any man-holes have become choked so as to need digging up to clean them. There is not a single ventilated trap in the building; pan water-closets are used; the safe-wastes connect with the soil-pipe and are supplied by weeping-pipes, some of which have become choked and all of which are liable to fail; the tank overflow is connected in the same fashion; the servants' water-closets and slop-sinks are placed in close compartments without any means of ventilation; the pump to supply the tank is of a bad pattern, and hence there is a deficiency of water for flushing fixtures; the hot-water circulation is defective, so that the occupants complain that they cannot take a hot bath when they want to; and lastly, there is no air-inlet at the front wall, nor traps to the leaders, some of which end close to windows.

This is but one of a dozen similar houses which I have had occasion to overhaul, and it seems time to publicly remonstrate against such neglect and to place the responsibility where it justly belongs, upon the architects' shoulders. In the case just referred to, in which the plumbing cost some $3000, the specification reads as follows: — "All the plumbing work to be done in first-class manner, with materials of the best kind. It is intended to have a complete and perfect job by this specification, but if anything should have been omitted to make it such it must be done without extra charge." I ask your readers in view of the details given, whether this specification has been carried out, and who is responsible for the failure to do so?

CHAS. F. WINGATE.

BURNING OF THE HALL BLOCK, TOLEDO, O.

TOLEDO, December 20, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

The burning of the Hall Block, which occurred on the morning of the 15th inst., was a very notable event in the history of Toledo fires; the loss being about $1,000,000. The building was but about six years old, and had a frontage of about 230 feet on St. Clair street, and 120 feet on Jefferson,— all the frontage elaborately cut in stone. It was four stories high, with basement, and fully occupied throughout. The building formed one end of a square bounded by Jefferson and Madison streets, the famous Boody House, nearly the size of the Hall Block, forming the other end, while between them is the elegant First Congregationalist Church, 70 feet frontage. The entire combination of buildings was pronounced by many visitors and art connoisseurs the finest in contour to be seen in the United States.

It is said that the destruction of the building could have been avoided and confined to the central section where it started, had it not been for certain openings being left in the brick walls in the attic, thus giving the fire easy access to nearly the entire roof. The arched tops to the vaults in the upper stories did not seem to resist the pressure, and were broken, causing, it is said, much loss in the destruction of their contents, thus proving that the common brick arch is a very unreliable dependence for vault coverings.

Two well-known architects, Messrs. Gibbs & Co., and E. O. Fallis, lost their very valuable office accumulations of many years, with little or no insurance.

The building was owned by the Connecticut Mutual Life Insurance Company, and there seems to be a prospect that it may be rebuilt in some form in the near future. *

STRAW LUMBER.

CHICAGO, ILL., December 18, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen.—In reply to letters and editorial inquiry in your issue of September 9, concerning straw lumber, I have made repeated examination of a considerable quantity in place here in large warehouse buildings at the corner of Market and Monroe streets, since September 20.

Of the specimens examined, all were a yellow-brown in color, $\frac{3}{16}'' \times 33'' \times 15'$ in size, being six (6) layers in thickness. The cement appears a glue rich in resin, and it or the rollers have given a sizing to both sides which is imperfectly cemented, — all is so toward the edges. It cuts well, saws well, and can unquestionably be carved, but is at present unfit for inside finish on account of the rough surface it presents for oiling.

It does fairly well for ceilings and floors, but the success of the product in the future is dependent on more perfect cohesion of the layers, to prevent warping.

I enclose a circular of a Kansas company, whose claims for the *constructive* use of the product I consider more justifiable at present than for the *artistic* uses hoped.

I have the honor to forward also for your personal examination, a specimen of some in use, and shall be glad to contribute further facts concerning it on application of your correspondents.

I am, very respectfully yours.

EDWARD A. KENT.

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NOTES AND CLIPPINGS.

The Recent London Fire. — Among the most serious obstacles the London Firemen have to contend with is an insufficient supply of water. Three private corporations control the water supply, and under their old fogy system of management water is not available at times when most required. Whether or not there was a deficiency at last week's fires, the accounts thus far do not state. But one thing for which the Board of Works is responsible, and which must have contributed to the spread of the fire, is the small number of men employed by them to man the apparatus. The newspapers have frequently complained of the insufficient number of men in the employ of the Brigade, and that the complaint is well founded, is shown from the fact that there were last year but 536 firemen of all ranks employed, while in New York, embracing but about one-third the area of London, 923 men were employed. London has 38 steam fire-engines and 115 hand-engines, while New York has 64 steam-engines and no hand-engines. Each city has, in addition, hose-carts, ladders, fire-boats, etc., but the above figures show that, for land-service, New York, with one-third the area to cover, has a greater capacity than London for delivering water at fires. The use of hand-engines does not necessitate the employment of so many men, for they rely upon "pumpers" picked up up at the scene of the fire to work the brakes for a shilling an hour. But the absence of trained firemen to handle the apparatus, hose, etc., is a serious drawback to the efficiency of the Brigade. In 1881 the entire expenditures for the London Brigade were in the neighborhood of $500,000, which is about one-half the amount New York paid in the one item of salaries to firemen. The last fire of magnificent proportions that occurred in New York, was in 1835, when the loss footed up to about $20,000,000. No fire equal to that of London last week has occurred in this country since the Boston fire of 1872. — *Fireman's Journal.*

An Interesting Dry-Dock. — The dry-dock of the Screw-Dock Company, near Catherine Ferry, New York City, is one of the oldest and also one of the most interesting dry-docks at this port. There are four large hydraulic pumps and four small ones, the four large pumps performing eighty per cent of the work. In the winter-time alcohol is used in place of water, in order to avoid the danger of bursting the pipes due to frost. A large tank, containing about twenty-five barrels of alcohol, is in the engine-room. There is very little waste of this alcohol, and it is used again and again until it becomes so weak that upon testing it is found that it will freeze, when two barrels of additional spirit being added the entire liquid will be found to stand the freezing test. There are three docks of different sizes. The large dock consists of twenty-six sections, each six feet in width; the middle dock, of twenty sections; and the small dock, of twelve sections. These sections are hung in chains that run over pulleys and are attached to screws. When a vessel is run into one of these docks, the screws on each side of the dock are worked by hand until the keel-box on each section touches the keel of the vessel, when hydraulic power is applied and the vessel's keel is lifted above the surface of the water The docks, as already indicated, are situated on the East River, and the maximum weight which they can lift amounts to about 1,000 tons. — *Iron Age.*

Making Spiral Springs for a Street-Car Motor. — The experiment undertaken by the Steel-Spring Car-Motor Company, Philadelphia, of running street-cars by spiral springs, wound up at the beginning of a trip, is being successfully pushed forward. The first of the eight coils, each three hundred feet long, has been already cast. The billet, twenty-seven feet long, six inches wide and four inches thick, is passed through the rolls and broken into a length of one hundred feet. It is then heated, thirty feet at a time, and rolled down to a thickness of one-quarter of an inch. In the first experiment it was found that the band was ten feet over the three hundred feet required. A special furnace, of course, had to be built, fired by seven grate places, opposite each of which was a flue communicating with a main flue running the whole length of the furnace. The band has been taken from Pittsburgh to Philadelphia, where it is being tempered and wound into the form of a spring. There are doubts expressed whether springs will be practicable as a matter of applying a power, and the experiment is being watched with much interest. — *Exchange.*

A Puritan Pedestal. — Into the studio of a Boston sculptor came, a month or two ago, a little, dried-up old man, who, after various shrill-voiced inquiries as to what the sculptor had ever done to prove his merit, produced a roll of paper which, when opened, showed a very ugly design for a pedestal. "Now that pedestal," piped the visitor, "is pure Puritan, studied up from authentic documents. The stone-cutter that's making it, he wanted to cut off those corners, but I told him it was a pure Puritan pedestal, and we'd had it studied up from the most authentic documents, and I didn't think it would do to cut 'em off." So he had come for advice on the corners of the "pure Puritan" style, which is new to myself at least, but which may now be seen, "studied up from the most authentic sources," in the pedestal of the Bridge statue unveiled at Cambridge last week. — *Exchange.*

A Mexican Cross. — The stone cross brought by Charnay from Teotihuacan is creating some interest in Paris. It is about 4 feet high, thick-set, with a relief on one of its faces in the shape of a blunted Greek cross, and on the base four crosses in relief. M. Hamy, keeper of the Trocadéro Museum, holds that it is an emblem of Tlaloc, god of storm and rain, one of the oldest of Mexican gods. The presence of such crosses in Mexico caused the Spaniards to believe that St. Thomas, whom they identified with Quetzalcoatl, had preceded Christianity in Mexico.

Baudry's Paintings in the Paris Opera-House. — Baudry's paintings in the opera-house at Paris have been cleansed with bread. The *Athenæum* reports that they have sustained much less damage than was supposed.

A Papier-Mache Church. — A church in Bavaria accommodating one thousand people is said to have been almost entirely built of papier-maché.

Dispensing with the Aid of a Middle-Man. — A colored woman has been sentenced to sixty-six and two-thirds days in the work-house of Nashville, Tenn., for stealing a brick pavement. She used the material to build a chimney in her house.

The Life of Telegraph-Poles. — The Western Union Telegraph Company has estimated the life of telegraph-poles as follows: cedar, sixteen years; chestnut, thirteen; juniper, thirteen; spruce, seven years. Cedar, chestnut and spruce are used in the Northern States; juniper and cypress in the Southern States, and redwood in California. Poles cut in the summer will not last as long as those cut in the winter by five years. Soil and climate, of course, make a difference with the life of poles. — *Northwestern Lumberman.*

Discoveries in Magna-Græcia. — Francois Lenormant has returned from his exploring tour about Magna-Græcia and made report to the Académie des Inscriptions. He has found 200 Latin and 30 Greek inscriptions never recorded, and found a clue to the site of Terina. The ruins of Medina and Hipponion have been found, and the site of the Greek colony Metapontum identified. Lenormant thinks he has evidence that black pottery of a primitive type, like that which he has been noticing in recent numbers of *L'Art*, was once common over the entire southern portion of Italy, and forms a definite period of art. A pottery with geometrical ornaments like that of Cyprus has been found in Apulia. Altogether the tour of this distinguished archæologist from Lucera to Reggio has proved very fruitful in discoveries and suggestions.

Painting Canvas Roofs. — One of our readers complains that in painting a canvas roof the quantity of paint necessary to fill the canvas was so enormous, especially in hot weather, that he was quite astounded, using several gallons where he expected to use as many quarts. While this large quantity is an advantage, inasmuch as it is the resisting medium of the roof (and the larger the quantity the better in many respects is the roof), it seems desirable to obtain a coating with a less expenditure of oil and paint. In painting carriages and wagons a very good practice has been to make a quantity of wheat or rye flour paste, and with this give the canvas, after it is laid upon the roof or panel, a good and even coat. The paste should be about as thick as that used for paper-hanging. This will leave the canvas as tight as a drum-head, and, at the same time, fill the surface sufficiently to prevent so great absorption of the oil. Glue size has the same effect and is easily applied. It is said that panels painted in this way are very durable, and that the paint never cracks or scales off. White-lead in oil colored with ochre is probably one of the best paints which can be applied upon the roof. Possibly, for the sake of its fire-proof qualities, a final coat or two of mineral paint might be of advantage. — *Metal Worker.*

Aluminum Processes. — A London dispatch, stating that a process for the cheap production of aluminum had been discovered was shown by a *Times* reporter to Charles S. Platt, a gold and silver refiner and assayer. Mr. Platt said that so-called cheap processes for making this metal have been discovered periodically in the last fifteen years, but he had never seen any of them amount to anything. Aluminum is entirely obtained from the Aluminum Society of Paris, who make it from clay. Before the Franco-Prussian war it was said that it was made in England and Germany extensively, but when Paris was under siege it was found that the metal could not be obtained anywhere. No process has yet been found that can compete with the production of this society. Mr. Platt thought the new process spoken of could not be in operation, or the market would necessarily be affected. Aluminum is now worth $1.25 an ounce, troy weight, and not more than a ton a year is used in this country. It is the lightest of metals, and is used in various ways, in aluminum bronzes and what is known as aluminum gold, a union with copper. Dentists use it for making mouth-plates for teeth, and it is available for mathematical and some surgical instruments. A bar to its general use in manufacturing processes is the fact that it cannot be soldered and must be riveted. — *N. Y. Times.*

Tunnel under the Elbe at Hamburg. — The Senate of Hamburg, Germany, as recently reported in an exchange, have had under consideration a scheme for constructing a tunnel under the Elbe, and an elevated railway in the city. The construction of a bridge instead of a tunnel is said to be out of the question on account of the width and crowded state of the harbor, and the author of the project, Mr. Westendorp, has designed the tunnel of such dimensions as would provide both for vehicles and foot-passengers, and a double-track railway for freight and passengers. This he proposes to effect by building the tunnel of two stories, the road for vehicles and pedestrians to be in the upper story, and the lines of railway in the lower story. The crown of the tunnel for a length of 650 feet (the width of the navigable channel of the Elbe) is to be from 20 to 30 feet below low-water mark, and separate openings are to be provided for railway and roadway, the ascent to be very gradual, about 1 in 35. The tunnel is to be an iron cylinder lined with brickwork, the upper story resting upon columns placed between the two lines of rails. The latter would be in continuation of the track of the elevated railway in the city, which is to be of a decorative iron-work, and similar to that of the elevated roads of this city. Three stations will be provided at different points, where pavilions are to be erected for taking up and letting down passengers. The tunnel is to be lighted by electricity, and ventilated and drained by powerful machinery, and provisions are also to be made for taking gas and water pipes, telegraph and telephone wires, etc., through it. The estimated cost of the tunnel and railway is 26,000,000 marks, or about $6,250,000, and they are to be completed in five and a half years. — *Iron Age.*

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 6.] SATURDAY, AUGUST 5, 1882.

THE PRESCOTT PATENT DOOR-HANGER.

We take the liberty of calling the attention of the public to the new device for sliding doors, namely, the Prescott Door-Hanger, one of the most decided improvements in door hanging, and one which is being adopted by the leading builders in the country, especially where a sliding-door is to be used.

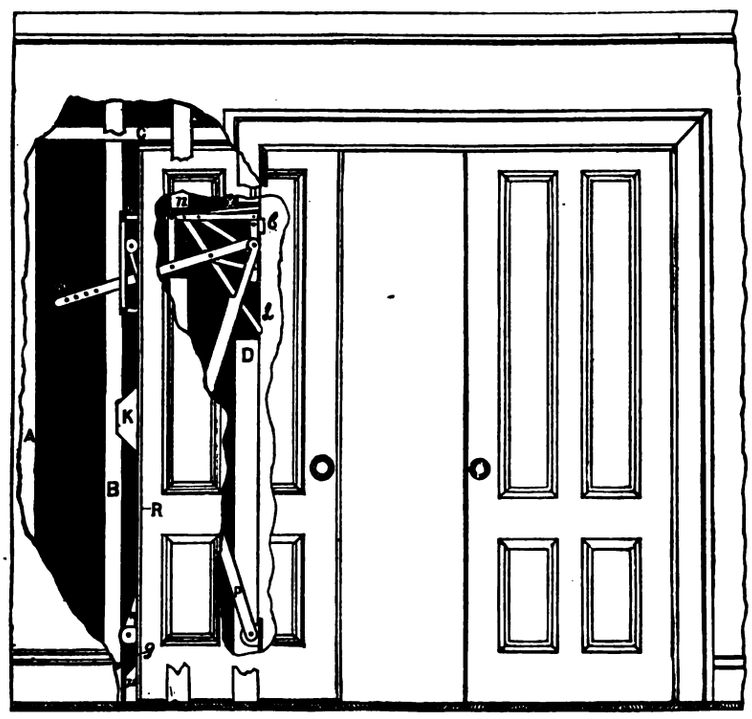

Fig. 1.

The great practical value of the Prescott Hanger is strikingly shown in the "Balance Hangers." Figure 1, which shows a pair of drawing-room doors, one closed and the other partly open, with the door on one side of the partition broken away, showing the hanger secured to the other; this is designed for use only on doors which move between double partitions, and is especially adapted for parlors. The hanger is secured to the back edge of the door, and the front of the door-frame behind the casing. When the door is open the hanger is crossed on one side of the door, between the door and the wall to which the hanger is connected. When the door is closed the hanger stands perpendicular behind the jamb-casing, and at all times is concealed from view.

They may be applied to heavy hard-wood doors, which may then be opened or closed with surprising ease and perfectly noiseless movement.

By the illustration it will be seen that the Balance Hanger is a contrivance of great merit. By its use no track is required either above or below; in its operation it allows the door to rise a little, thus saving wear of carpet, which is a very important item for consideration. The Balance and Brace Hangers are made right and left, in such a way that when opening right-hand doors the door moves to the right, and left-hand doors to the left, when facing that side of door over which the hanger moves.

Figure 2 exhibits the "Brace Hanger," with portion of door cut away to show its position when the door is half open.

The "Brace Hanger" is designed for use upon doors between parlors, in public buildings, closet doors, or in any place where it is desirable to have the hanger entirely concealed from view, in order to secure a handsome finish. It will be seen by referring to the cut that this hanger slides a door between partitions or upon either side, and is entirely out of sight at all times; the door is hung so as to rise a little as it moves back; when closed it makes a tight joint upon the floor or carpet, and yet moves back without friction or wear, the same as the Balance Hanger, Figure 1.

The question is often asked, "Can these hangers be applied to doors after a house has been plastered?" As the hanger is secured to one of the jamb-studs by angle-irons it admits of hanging the door at any time, as the casing has to be put on last, which conceals the hanger from view and at all times, and

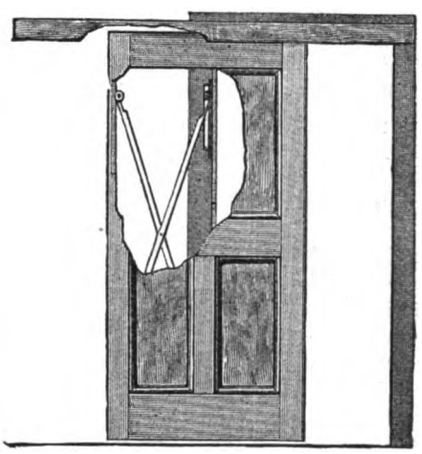

Fig. 2.

when hung the door moves with such perfect ease, that it is a puzzle to many as to what the door actually moves on.

Figure 3 exhibits an inside view of the "Truss Hanger."

The "Truss Hanger" is particularly designed for use upon barn, stable, depot, or storehouse doors, or in any place where elegance of finish is not desired, the hanger being exposed to view, as shown in the above cut, one door closed and the other open.

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Truss Hangers will operate doors inside or out of buildings, but should always be attached to the inner side of door. A child is able to move a door hung with this hanger as easily as though it were hung upon hinges.

Balance and Brace Hangers are being very extensively introduced into new residences in New York, Philadelphia, Baltimore, Washington, Boston, San Francisco, and in fact all the principal cities throughout the United States and wherever they have become known; and the convenience attending their use leading in many instances to the substitution of this device for swinging doors, especially in closets, effecting a great saving of room, which is of great advantage.

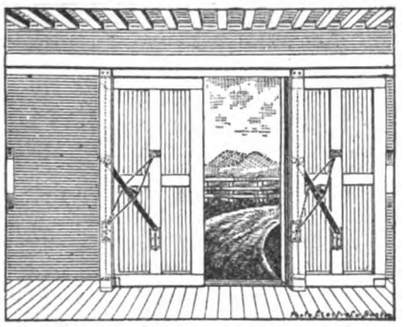


Fig. 3.

The Truss Hanger illustrated in Figure 3, has been quietly gaining in public favor until it has become known, by reference of one party to another, here and there all over the country.

Invented at first chiefly for barn doors, it has since been found far superior to any device known for sliding-doors of factories, sheds, and warehouses: doors of the largest size are moved with the greatest ease.

Evidently this may be termed a revolution in the hanging of sliding-doors.

The highest premium was awarded at the Exhibition for 1880 of the New England Agricultural Society, New York State Agricultural Society, Connecticut State Agricultural Society, Cincinnati Industrial Exposition, American Institute, New York.

Manufactured and sold by the

PRESCOTT MANUFACTURING COMPANY,
OFFICE 235 WASHINGTON STREET, BOSTON, MASS.

PIRATING TRADE-MARKS.

The following article appeared in the *Commercial Industrial World*, of Chicago, in its issue of February 9th, 1882. It bears so strongly upon the piracy of our own brand of "OLD STYLE" Roofing, that we take the liberty of reporting it:—

"Pirating trade-marks seems to be growing with a rapidity that is anything but complimentary to the sense of fair dealing which should prevail in the commercial world. Some individuals very conveniently forget that there is any such thing as property in trade-marks; but these gentlemen ought to be instructed by the more honorable portions of the trade that it is not a safe nor legitimate transaction to trespass upon the rights of others by appropriating this species of property. Men have labored years and spent fortunes in building up a business in certain commodities, and these commodities, to which they have given a certain specific name, have become familiar to the trade and their designation is, in reality, an important part of the thing produced. The value of this name, of course, depends upon its age and circulation, but whether it is of greater, or less value, it matters not, the *right* to the property in the name is one which, by law and common civil usage, should command respect.

It may seem a nice thing for some one, who is devoid of principle and enterprise, to imitate the trade-mark of another, and thus, without risk, trouble, expense, or brain work, be benefitted by their unlawful appropriation of another's property; but, if he has not honesty, or self-respect enough to keep him from his unlawful course, he should be restrained by the public condemnation of his brethren in the trade. Some business men take the matter in their own hands and compel an observance of their rights, by ridiculing and publicly denouncing the parties who would feloniously appropriate their special trade-mark; some notable instances of this method of treatment could be cited at the present moment. But, while some men are capable of thus defending their rights, others are not, and it is due to the honest trader that he should receive the assistance of other traders when attempting to enforce his rights against those who would pirate his trade-mark, because it is a matter in which all are more or less interested.

But, it may be asked: How can the trade assist a single individual in protecting his right against infringers? The answer is, they can refuse to become a party to the illegal transaction by refraining from purchasing articles whose trade-marks are pirated. They can whenever occasion requires denounce the piratical act, and, whenever the case is clear, hold this act as an evidence of the commercial dishonor of the party perpetrating it.

Some may say that this is an individual matter and that the trade, generally, should not be called upon to interfere between parties who make claim to the same trade-mark, any more than they should be called upon to interfere between parties who lay claim to the same piece of land. There is a distinction, however, between the two cases. In the former the trade are interested in two ways: First, in enforcing a wholesome respect for the property in trade-marks,—a matter in which they are directly interested,—and second, in maintaining the reputation of their trade, which, certainly, should not be a light consideration with them.

If it is once known that there is perfect immunity for those who appropriate trade-marks the value of this species of property will be comparatively worthless. While the courts offer redress in many cases, yet the dealer should not be subjected to this expensive and tedious method of protecting his rights, when, by the cultivation of a right public spirit, infringers would be restrained from their unlawful course, and the necessity for going into courts to protect one's rights would be obviated. When the time comes when it is considered as much of an offence to steal a trade-mark as it is to steal a horse there will be far fewer depredations of the former description than now. In point of principle there can be no difference between the two species of offences. Men can be restrained by the establishment of a good, healthy public sentiment which would condemn their piratical acts, when they would not be restrained by fear of the penalties of the law."

In our own case, regarding our "Old Style" brand of Roofing, and the deserved reputation that it now enjoys as undoubtedly the "best" Roofing Tin made, the facts are simply these:—

1. Many years ago we "invented" a re-dipped, or double-coated Roofing Plate, and arranged with our friends—"The Copper Miner's Tin Plate Co.," of Taibach, Glamorganshire, Wales — to make it exclusively for us. It is, therefore, strictly a maker's brand in every respect, and "is not in any way a private brand."

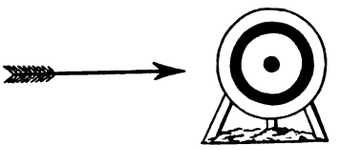
2. We naturally looked around for a "name" or "brand" that would distinguish this one plate from all others, and selected the two words "Old Style," for a brand "that would not conflict in any way with any other maker's brand," and which had never been used before on any plate.

3. Our brand of "Old Style" is duly "registered" as a "Trade-Mark," and we alone have clearly the exclusive right to use it. We have imported and sold this brand for many years, and it has deservedly acquired the highest reputation. We were not disturbed in our justly acquired possession of it until July of last year, when we were surprised to find that an "imitation" was being imported, and that our brand had been stolen.

4. As "imitation is the sincerest flattery" its merits naturally provoked imitations, but it was left for one maker alone to deliberately appropriate our "brand" with the sole view of injuring it.

5. Hitherto, when a brand has even been encroached upon, an appeal to gentlemanly feeling and business honor has been all that was necessary. In this case, however, remonstrances have been in vain, and our friends—"The Copper Miner's Tin Plate Co."—are obliged to seek in the courts damages for this infringement of our "Trade Mark." As there can be no question of our legal right in the matter, we ask the trade to do all in their power to discourage this piracy of a well-known brand that has been registered as a "Trade-Mark."

6. To guard against imitations of the "Old Style" Roofing in the future, we shall use our "Registered device—an arrow pointing to the centre, or 'bull's eye' of a target," in connection with this brand.



In addition to the above this important fact should be borne in mind; "the cheapest kind of Roofing Plates may be easily re-dipped, thus giving a good looking surface, and they can be sold as double-coated plates, at a high price." An article is not worth imitating if it is not good.

The genuine "Old Style" Roofing is double-coated, or re-dipped, and the surface has a heavy mottled appearance. The coating of metal is so complete and heavy that it is absolutely impervious to either water or dampness. The "surface" of the "Old Style" is absolutely "perfect."

The quality of the iron is of the finest and purest charcoal, made in the old-fashioned way, and is as tough as leather.

The boxes are made of good tough wood, and strongly strapped with hoop iron, and are distinctly branded on the end and side, in heavy block letters, burned deeply into the wood — "Old Style"—"Warranted Extra Fine Quality, Double-Coated Roofing Tin." In addition to this, each box contains a small tin decorated card, bearing the name of "N. & G. Taylor Co., Philadelphia."

The "imitations" now being offered by other parties bear none of these distinguishing marks.

N. & G. TAYLOR CO.,
PHILADELPHIA.

The American Architect and Building News.

PUBLISHED EVERY SATURDAY BY

JAMES R. OSGOOD & COMPANY,

211 TREMONT STREET, BOSTON, MASS.

An illustrated Journal of Constructive and Decorative Art, devoted to the Interests of Architects, Builders, Decorators, etc.

15 cents per copy; $7.50 per year; $6.00 in advance; 12 Monthly Numbers with Detail Sheet, $1.75.

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THE NEW SYSTEM OF BRICK MAKING.

IN brick making, as in all other industries where the demand is great, says the *Scientific American*, and machinery is replacing hand labor, as a result it is not only possible to bring the rate of production up to the demands of the market, but the quality of the product is vastly superior to that of the best hand-made article, and we think that with our system the quality of brick manufactured is far in advance of the product of other machines. Bricks made by machinery have been commonly deficient in strength, unequal in size and density. The Gregg triple-pressure and combination brick-machine possesses new and valuable features, which insure a yield of bricks superior to the best hand-made, and at a comparatively small cost. These bricks are superior in appearance, and in the matter of homogeneity and strength they are far ahead of any other brick made.

The following report of tests made by General Q. A. Gillmore shows the extraordinary strength of these bricks:

UNITED STATES ENGINEERS' OFFICE.

WILLIAM L. GREGG, ESQ.: —

Dear Sir,—I have the honor to state that some tests have been applied to the bricks received from you with very satisfactory results.

The bricks possess remarkable density, hardness, and compressive strength.

The tests made and the results obtained are given below:

FIRST TEST.

Three bricks were placed together without mortar, one above the other, flatwise, making a pile 8 inches long, 4 inches wide, and 6⅝ inches high, the upper and lower sides of each brick being rubbed to secure good contact.

The pile was then subjected to a pressure of 100,000 pounds, without cracking or disturbance of any kind. Surface pressed, equal to 32 square inches (4 × 8).

The pile was subjected to pressure between thin pine cushions, one below the lower brick and the other above the upper one.

SECOND TEST.

Three half bricks, making a pile 4 inches by 4 inches and 6⅝ inches high, were then subjected to pressure between wooden cushions. Area of surface pressed, 16 square inches (4 × 4).

The pile crushed at 90,000 pounds or 5,625 pounds to the square inch.

THIRD TEST.

Some two-inch cubes were cut from the bricks, and crushed separately, with the following results:

No. 1 crushed at 40,000 pounds; equal to 10,000 pounds to square inch.

No. 2 crushed at 37,000 pounds; equal to 9,250 pounds to square inch.

The above were crushed between steel plates.

No. 3 crushed at 37,000 pounds; equal to 7,750 pounds to square inch.

No. 4 crushed at 30,000 pounds; equal to 7,500 pounds to square inch.

Nos. 3 and 4 were crushed between one-quarter inch pine cushions.

The crushing strength of these bricks is greater than any bricks ever tested by me.

Very respectfully,

Your obedient servant,

Q. A. GILLMORE,
Lt.-Col. Eng'rs, Bvt. Maj.-Gen.

Similar tests were applied by direction of the Supervising Architect of the United States, at the Treasury Department, Washington, with the same results, and the bricks were ordered to be used in the government work.

Heretofore in the construction of bricks by machinery, and especially face or front bricks, it has been found practically impossible to supply an equal amount of clay to each of the mould boxes. This results in unequal size and density in the bricks, and when but one pressure is imparted to the clay, as in ordinary machines, the bricks are often defective in strength, at the corners and edges especially, and hence unsuitable for use as first quality front or face bricks. These serious objections have been overcome by Gregg's brick-machines.

The mechanical construction of the semachines is such that the heavy developing pressures take place while the mould table is at rest, thus requiring but a nominal amount of power to operate them, and avoiding strain, wear and tear, and breakage, as well as the great loss of power common to other machines.

Brick-machines may properly be classified under three heads: dry-clay machines, slush machines, and crude or moist-clay machines.

From the peculiar construction of dry-clay machines where "filler boxes" or graduating measures are used to fill the mould boxes, the clay must be dried and granulated to fill with any degree of regularity into the "filler boxes," and thence into the moulds. And when moulds are grouped together it becomes a physical impossibility by the dry-clay system to fill them alike, hence those deficient in clay will but partially develop the bricks; this, added to the fact of the cohesive quality of the clay being destroyed by extracting the moisture before moulding, complete vitrifaction cannot take place in the burning, and the result is that bricks made from the dry clay disintegrate with the action of the elements. In the manufacture of slush brick the other extreme is met. To facilitate moulding in the "hand way" a large portion of water is added, and the bricks being so soft must be spread upon floors to dry. The slow out-door process of drying, or evaporation, is one of the most favorable processes for the hand-brick maker, but it requires the continuous insurance of favorable atmospheric influences, and a continuity of fair weather, which practically can never be relied on.

Clay, to be made into bricks by hand moulding, must of necessity be so wet that at least 25 per cent of water must be evaporated before it is safe to burn, so that in fact, in works producing 30,000 bricks per day, upwards of 23 tons of water have to be evaporated therefrom every twenty-four hours—the labor attending which being an expensive item, and the bricks being rendered porous by the operation.

Gregg's triple-pressure and combination brick-machines occupy a medium position between dry-clay and slush machines: thus a first saving is affected, as the machines accept the crude clay, and manufacture it to advantage in so stiff a state as not to contain more than one-eighth the above amount of water to be evaporated, and yet all of its cohesive qualities are retained. The fusion being complete, the bond between the particles is perfect and the bricks are less porous, consequently stronger, and absorb less moisture when burned.

After being pressed the bricks are placed on iron cars and passed through a drying tunnel, where they are dried with regularity, not being subjected to rains and atmospheric changes as by the old out-door system; they are then passed directly to the burning kiln, and are there burned and made ready for the market.

The great benefit to be derived by operating this system is not only the economy and regularity of the manufacture, but the increased value of the product. By keeping a strict account of the cost of manufacturing 1,000,000 bricks by the old system and a similar account of a like number made by the Gregg system, it will readily be seen that they can be made by the latter process at one-half the cost of the former, as well as at all seasons of the year, and be worth twice as much in the market as a kiln of ordinary brick.

The Gregg machines have obtained a world-wide reputation at the various expositions, both in this country and in Europe, where they have invariably received the highest awards.

Mr. William L. Gregg, the inventor of this system, has organized in New England the "New England Press Brick Manufacturing Company," having offices in the Equitable Building, Boston, Mass. The works of this company are capable of turning out 100,000 bricks per day, this being the largest production of fine bricks made in any of the Eastern States.

This establishment is specially fitted with machines for turning out the finer grades of bricks for fronts, mouldings, cornices, etc., ornamental and shape bricks.

All inquiries should be addressed to the

GREGG INTERNATIONAL
BRICK MACHINE COMPANY,
EQUITABLE BUILDING, BOSTON, MASS.

NOTES.

MESSRS. Johnson & Wilson, agents for Saylor's Portland Cement, 91 Liberty Street, New York, report that the capacity of the works has been increased to 8,000 barrels per month.

OSGOOD'S American Guide-Books.

The White Mountains.
Largely augmented in 1881. With 6 Maps and 6 Panoramas. 1 vol. 16mo. Flexible cloth. $1.50.

New England.
With 17 Maps and Plans. 1 vol. 16mo. Flexible Cloth. $1.50.

The Maritime Provinces.
With 9 Maps and Plans. 1 vol. 16mo. Flexible Cloth. $1.50.

The Middle States.
With 22 Maps and Plans. 1 vol. 16mo. Flexible Cloth. $1.50.

"Fortunately we now have a guide-book library which, as far as it extends, is every whit as good as Baedeker. Clearness and compactness, the two lesser requisites, have been attained. As for accuracy, the amount of work done by the editor has been enormous. To say that the books are better than any American books of the sort that have hitherto appeared would be superfluous; there is no comparison to be made between them and their predecessors."—*The Independent.*

A Tallahassee Girl.
The Ninth Round-Robin Novel. 16mo, $1.00.

"The magnetic beauty of the scenes described and a breath of Magnolia-blooms pervade the book."—*N. Y. Home Journal.*

"A bright, fresh, crispy story, lively from beginning to end, and full of poetic prose."—*San Francisco Post.*

"Its pen-pictures of Tallahassee are so enchanting that one longs for wings to fly to that region of delight, and repose among its flowers."—*Christian Intelligencer.*

JAMES R. OSGOOD & CO., Publishers,
211 Tremont Street, Boston.

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(Continued from page 68.)

TARRYTOWN, N. Y.—A residence, stone and frame, to cost $7,000, is to be built for Mr. Wm. C. Casey, from designs of Mr. H. R. Marshall, of New York.

TOWSON, BALTIMORE COUNTY, MD.—One-st'y fire-proof addition to court-house; cost, $10,000; Mr. Frank E. Davis, Baltimore, architect.

"UNIVERSITY OF VA.", VA.—Observatory for the University; Wilson Bros., of Philadelphia, architects.

URBANA, O.—The corner-stone of the new Baptist church was laid July 20.

WETHERSFIELD, CONN.—Mr. John C. Mead is the architect of a stable for Mr. S. W. Robbins. It is of wood, measures 38' x 48' and 22' x 40', and costs $5,000.

Industrial.

AKRON, O.—The Portage Straw-Board Co. is to build a brick factory, 160' x 350'.

ALLENTOWN, PA.—A hardware manufactory will soon be established. The foundry will be 50' x 120', main building 35' x 80'.

ATHOL, MASS.—The Athol Machine Company is preparing to build its new brick foundry, which will be 45' x 90', with an L, 25' x 60'.

NASHUA, N. H.—The White Mountain Freezer Company have broken ground for a foundry.

NEW BRITAIN, CONN.—The North & Judd Manufacturing Co. are building a new malleable iron foundry, 9-0' x 130', and a main building 40' x 185'; also, a two-st'y assorting-room, 40' x 190'.

SKOWHEGAN, ME.—It is stated that Keene Bros., Lynn, Mass., shoe manufacturers, have under consideration the building of a factory at Skowhegan.

VERMILLION, O.—The Bartlett Iron and Steel Company will soon build large works.

WARREN, MASS.—The Warren Cotton Company is to build several dwellings for the employes.

WESTFIELD, MASS.—The Smith Manufacturing Company is about building a large foundry.

WEST GARDNER, MASS.—Heywood Brothers & Co. will soon build a new shop, 75' x 200'.

YOUNGSTOWN, O.—The Malleable Iron Company is about building an addition, 70' x 150'.

Bids and Contracts.

HOLYOKE, MASS.—The contract for building the foundry and storehouse of the Holyoke foundry company has been given to Lynch Bros. for $16,037; Lynch Bros. have sub-let the wood and iron work to F. F. O'Neil.

PROPOSALS.

COURT HOUSE. [At LaFayette, Ind.

Sealed proposals will be received at the Auditor's Office of Tippecanoe County, Indiana at the City of LaFayette, until 2 o'clock, P. M., of **Tuesday, Sept. 12, 1882,** for furnishing all the materials and labor required in the erection, construction and completion of the new Court-House for said County, according to the plan, drawings and specifications, prepared by E. Max, architect, and now on file in said Auditor's Office. Bids are to be made taking into account the right of the bidder without charge to all the stone now delivered on the ground for said building, and also the right to use of the derricks, work-shed, and ground leased the County for the purpose of making bricks; and also the window-frames now made for first story; all being property heretofore provided and prepared for said building by former contractors, and by County received from them in settlement of non-completion of contract on account of the death of Francis L. Farman, one of said contractors. Bids will be received for the completion of the entire building from the condition in which it now is, and also for the distinct parts thereof according to said plan, drawings and specifications; and also for completing the first or basement story above the lower water-table, with the entire face of the stone in first story above said lower water-table bush hammered and sunk margins, instead of with stone with sunk margins and a rock pitched face. All bids to be filled out according to blanks to be had of said Auditor for use of bidders, and by inserting amounts for work bid for, and without additional conditions or qualifications.

All bids must be accompanied with a good and sufficient bond, in a penalty of not less than one-fourth of the cost of the work bid for, signed by at least two responsible resident freehold sureties, according to act of Legislature, approved March 11th, 1875, (see acts 1875, page 36;) (also Act of Legislature, approved March 14th, 1877.) (See Acts Special Session, 1877, page 29).

Blank bonds will be furnished by Auditor of said County, and if sureties do not reside in Tippecanoe County, their goodness and sufficiency beyond any doubt should be certified to by Clerk of County where sureties do reside.

The Board of Commissioners reserve the right to reject any and all bids if in its judgment the interest of the County should so require.

By order of the Board of Commissioners of the County of Tippecanoe.

CYRENIUS JOHNSON, Auditor.

RAILROAD MASONRY. [At Philadelphia, Pa.]

PENNSYLVANIA RAILROAD COMPANY,
OFFICE OF CHIEF ENGINEER, 233 S. FOURTH ST.,
PHILADELPHIA, July 25, 1882.

Sealed proposals will be received at this office **until 9 A. M., August 10,** for all the graduation and masonry required by said Company to complete the Susquehanna and Clearfield Railroad from Keating to Karthaus, about twenty-two miles. Plans and specifications can be seen at Room No. 40 at this office.

WILLIAM H. BROWN,
345 Chief Engineer.

BUILDING. [At Benton Harbor, Mich.]

On and after August 3, 1882, we will be prepared to receive bids for the erection of a two-st'y and basement brick building, 85' x 125', at Benton Harbor, Mich. Plans and specifications can be seen at our office in Benton Harbor.

345 PITCHER, JONES & SONNER.

PROPOSALS.

IRON ROOF. [At Albany, N. Y.]

NEW CAPITOL,
OFFICE OF THE SUPERINTENDENT,
ALBANY, N. Y., July 20, 1882.

Sealed proposals will be received at this office (where proposal blanks can be procured) **until 12 o'clock, noon, Friday, August 18, 1882,** for furnishing and putting up all the iron-work required to build the roof of the west front (including both pavilions) of this building, in accordance with plans and specifications now to be seen at this office. Said work is to be completed on or before the 1st day of February, 1883.

Each bid must be enclosed in an envelope, addressed to the undersigned, indorsed "Proposal for Iron Roof," and must be accompanied by bonds of two sureties, residents of the State of New York, each to the amount of $10,000.

Said sureties are to guarantee that the bidders will execute a contract if it is awarded to them, and will perform the same faithfully in accordance with the plans and specifications. The right is reserved for the Superintendent, with the concurrence of the New Capitol Commission, to reject any or all bids, and, after a contract is entered into, to declare said contract forfeited, whenever, in their judgment, it is not being performed for the interest of the State.

JAMES W. EATON,
346 Superintendent New Capitol.

IRON ROOFS, ETC. [At Memphis, Tenn.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., July 22, 1882.

Sealed proposals will be received at this office **until 12 M., on the 11th day of August, 1882,** for furnishing and putting in place complete the iron roofs, etc., required for the custom-house, etc., at Memphis, Tenn., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,
345 Supervising Architect.

IRON BRIDGE. [Near Madisonville, O.]

AUDITOR'S OFFICE, HAMILTON CO., O.
CINCINNATI, July 17, 1882.

Sealed proposals will be received at the office of the Commissioners of Hamilton County **until Saturday, August 12, 1882, at 12 o'clock, M.,** for the construction of an iron superstructure over Duck Creek, on the road from Madisonville to Oakley, near George Martin's Place, Columbia Township.

Clear span of 60'; clear roadway of 18'; strength required, 100 pounds per square foot of floor surface in addition to its own weight. Ultimate tensile strength, 50,000 pounds per square inch. Five will be used as a factor of safety. Bidders must furnish their own plans and specifications, accompanied by full and complete strain sheets.

The Commissioners reserve the right to reject any or all bids.

Proposals should be indorsed as above, and addressed to the Commissioners of Hamilton County, O.

W. S. CAPPELLER,
345 County Auditor.

IRON-WORK. [At Cleveland, O.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., July 19, 1882.

Sealed proposals will be received at this office **until 12 M., on the 7th day of August, 1882,** for furnishing and putting in place complete the iron roofs, etc., required for the north extension of the custom-house building at Cleveland, O., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,
345 Supervising Architect.

COUNTY INFIRMARY. [At Evansville, Ind.]

Sealed proposals will be received at the office of the Auditor of Vanderburgh County, Evansville, Ind., **up to 1 P.M., August 12, 1882,** for furnishing all materials and work required to erect and finish complete a County Infirmary Building, to be built on the farm recently purchased by the county, in accordance with the plans and specifications on file in the Auditors Office of said county.

Bidders will be required to give satisfactory security, as the law requires, for the faithful performance of contract.

Proposals shall be made upon blanks furnished by the Auditor, and indorsed "Proposal for County Infirmary."

County Commissioners reserve the right to reject any and all bids. WM. WARREN, A. V. C.

TIMBER, ETC. [At Washington, D. C.]

NAVY DEPARTMENT,
BUREAU OF CONSTRUCTION AND REPAIR,
WASHINGTON, D. C., July 12, 1882.

Sealed proposals to furnish timber and other materials for the Navy for the fiscal year ending June 30, 1883, will be received at this Bureau **until 12 o'clock, M., the 8th of August next,** at which time the bids will be open.

The proposals must be addressed to the "Chief of the Bureau of Construction and Repair, Navy Department. Washington," and must be indorsed "Proposals for timber, etc., for the Navy," that they may be distinguished from ordinary business letters.

Printed schedules of the various yards, with instructions to bidders, forms of offers and other information can be obtained on application to the Purchasing Paymaster or Commandants of the respective navy-yards, or to the Bureau of Construction and Repair, Navy Department.

No contracts will be awarded until after appropriations to cover the same have been made by Congress and been duly approved.

T. D. WILSON, Chief Constructor U. S. Navy,
Chief of Bureau of Construction and Repair.

PROPOSALS.

STEAM-BOILERS, ETC. [At Columbus, O.]

Sealed proposals will be received by the Adjutant-General, Treasurer, and Secretary of State, **until 2 o'clock, P. M., of Wednesday, the 16th day of August, 1882,** at the office of the Secretary of State, in the State-House, Columbus, O., for the construction and erection of certain works, and for making alterations at the said state-house.

The work will be divided as follows, viz.:

CLASS NO. 1.

Supplying and setting four steam-boilers, each 30' long and 4' 6" in diameter, with all necessary mountings.

CLASS NO. 2.

Supplying, fitting and hanging sundry steam-pipes and fittings, and also taking down, refitting and hanging sundry other steam-pipes and fittings.

CLASS NO. 3.

Supplying and fitting gas and water pipes.

CLASS NO. 4.

Masonry, plastering and concrete.

CLASS NO. 5.

Constructing raised floors in the Senate Chamber and House of Representatives, and sundry other carpenter-work.

CLASS NO. 6.

Sheet-metal and iron work.

CLASS NO. 7.

Paving and gas-tar concrete in basement.

The work may be let as a whole or in separate contracts, for each class of work indicated above.

Proposals must be made only on the forms supplied for that purpose.

The right to reject any or all proposals is reserved.

Satisfactory security will be required for the proper performance of the work under each contract.

Plans may be seen, and specifications, forms of proposals and forms of contract obtained, at the said office of the Secretary of State, Columbus, O., or at the office of Messrs. Anderson & Hobby, Civil and Sanitary Engineers, Johnston Buildings, Cincinnati, O.

SAMUEL B. SMITH, Adjutant-General.
JOSEPH TURNEY, Treasurer.
345 CHARLES TOWNSEND, Secretary of State.

COUNTY INFIRMARY. [At Evansville, Ind.]

Sealed proposals will be received at the office of the Auditor of Vanderburgh County, Evansville, Ind., **up to 1 P. M., August 12, 1882,** for furnishing all materials and work required to erect and finish complete a county infirmary-building, to be built on the farm recently purchased by the county, in accordance with the plans and specifications on file in the Auditor's office of said county.

Bidders will be required to give satisfactory security, as the law requires, for the faithful performance of contract.

Proposals shall be made upon blanks furnished by the Auditor, and indorsed "Proposal for County Infirmary."

County Commissioners reserve the right to reject any and all bids. WM. WARREN, A. V. C.

PARLIAMENT-HOUSE. [At Quebec, Canada.]

DEPARTMENT OF AGRICULTURE AND PUBLIC WORKS,
QUEBEC, June 12, 1882.

Sealed tenders, addressed to the undersigned, will be received at this office **until Wednesday, 16th August next,** inclusively, for the construction of a new Parliament-House at Quebec. The plans and specifications of the work may be seen at this office, every day, after the 31st of July next, between the hours of 10 A. M. and 4 P. M. The tenders must be endorsed: "Tender for New Parliament-House." The Department will not be bound to accept the lowest or any of the tenders. By order, ERNEST GAGNON,
Secretary. 346

TERMINAL STATION. [At New York, N. Y.]

Sealed proposals will be received by the Trustees of the New York and Brooklyn Bridge, at their office, No. 21 Water Street, Brooklyn, indorsed "Proposals for station at the New York terminus of the East River Bridge," **until 12 o'clock noon of August 12, 1882,** for furnishing all of the material and erecting complete a station building and viaduct at the terminus of the New York approach of the bridge.

Drawings may be seen and specifications obtained at the engineer's office, No. 279 Front Street, New York.

Also, for a similar station and viaduct for the Brooklyn terminus of the bridge.

Drawings may be seen and specifications obtained at the engineer's office, No. 279 Water Street, Brooklyn. W. A. ROEBLING, Chief Engineer.
345

PAINTS, OILS, HARDWARE, ETC. [At New York, N. Y.]

OFFICE OF THE INSPECTOR OF LIFE-SAVING STATIONS, No. 3 BOWLING GREEN,
NEW YORK CITY, July 24, 1882.

Sealed proposals will be received at this office **until 12 o'clock, noon, of Monday, the 14th day of August, 1882,** for furnishing supplies to be delivered at New York, for use of the Life-Saving Service for the fiscal year ending June 30, 1883.

The supplies needed consist of ship chandlery, paints, oils, etc., stoves, etc., hardware, crockery, etc., and many other articles, all of which are enumerated in the specifications attached to the forms of bids, which may be obtained on application to this office.

Proposals to be addressed to the undersigned, and indorsed "Proposals for Supplies."

The right is reserved to reject any or all bids, and to waive defects, if deemed for the interest of the Government.

J. H. MERRYMAN,
Captain U. S. R. M.,
345 Inspector of Life-Saving Stations.

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 7. SATURDAY, OCTOBER 7, 1882. Volume XII. No. 334.

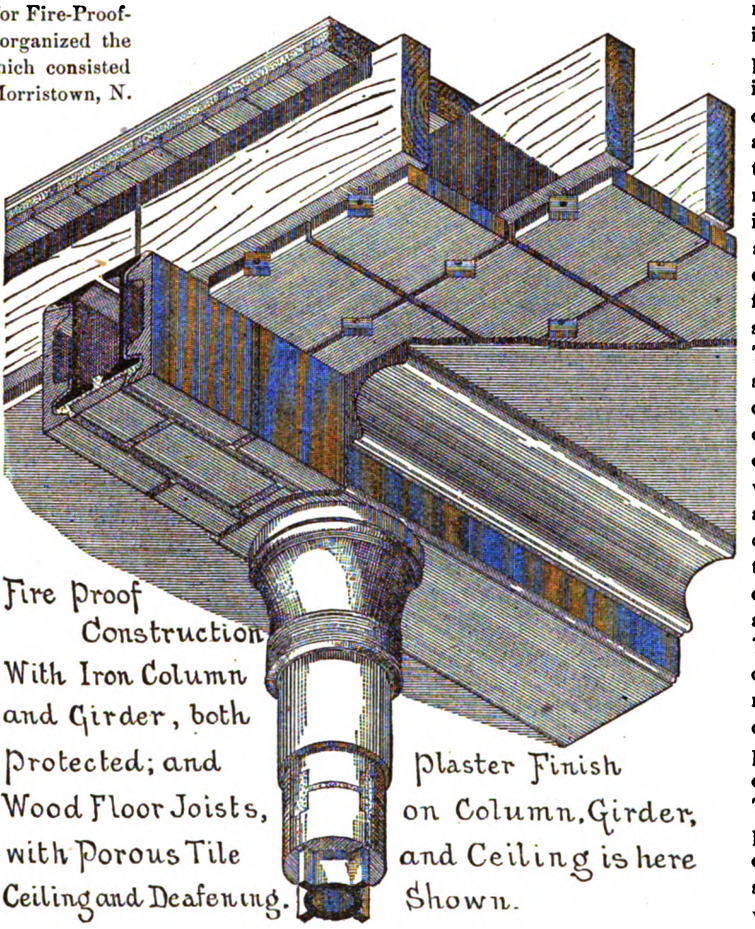
WORK OF THE WIGHT FIRE-PROOFING COMPANY.

It is now nearly a year since the organization of this company, to which the business and patents of P. B. Wight & Co. were transferred. Four years ago, after the sale of Mr. Drake's interest in the Patents for Fire-Proofing iron columns, Mr. Wight organized the firm of B. P. Wight & Co., which consisted of himself, H. B. Merrell, of Morristown, N. J., and Thomas Ferguson of Detroit, Mich., and decided to try the experiment of contracting for the fire-proofing of iron columns only. Two patents were taken out for three additional methods; so they were soon prepared to do everything required in that line, and to cover columns of every shape and make, whether in new buildings or old ones.

The experiment was more successful than anticipated. Architects ordered iron columns adapted to the process of fire-proofing, in their general contracts for iron-work; adopting such forms from the illustrated circulars as were best adapted to the purpose. The difficulty of finding men sufficiently skilled to properly finish the columns in plaster induced the firm to train a body of workmen in the finishing and ornamentation of columns. They were thus enabled to give artistic form and perfect finish to the fire-proof work.

Very soon the fire-proofing of girders was included in the work to be undertaken, and as Mr. Wight had meanwhile perfected and patented a method of constructing ceilings of porous terra-cotta, that could be used both under iron and wooden floor joists, the fire-proofing of ceilings was added to the business of the firm: so that under a steady demand for thorough fire-proofing with porous terra-cotta, — the only material that has ever withstood all the tests that can be applied to it, — there was gradually developed a complete system of fire-proofing for all purposes.

The organization of the Wight Fire-proofing Company became a necessity in order to meet the demand for work, which was constantly increasing; and with its organization it was decided to include, along with the special processes of its own, all the systems of fire-proofing in general use, and to do plastering in connection with fire-proofing. The Company now not only does its own plastering where its fire-proof work is used, but makes a specialty of all kinds of expert plastering in Portland and Keene's cement. The latter material, having the appearance of plaster, has also the hardness of marble. Two grades of this cement are used. The coarser kind has all the requisites for hardness, and it can be troweled to as smooth a surface as ordinary plaster. It is not perfectly white, and uniformity in color is not always obtained; but it can be tinted with earth colors so as to make substantial wainscotings that will not require painting. The finest grade is a pure white. It may be colored uniformly to any tint, and will take a polish equal to marble. The prevailing method of finishing columns is to work a moulded base and dado with Keene's cement, and above the dado to finish in plaster, with any desired amount of elaboration. The plain shafts may be of superfine Keene's cement, colored and polished. This company is now finishing the entire under side, together with the strings and well-hole aprons of the grand stairway of the store erected by Martin Ryerson, Esq., at the corner of Wabash Avenue and Adams Street, Chicago. This is all done in Keene's cement. It is elaborately moulded. The platforms are carried on iron columns, fire-proofed with porous terra-cotta and similarly finished. The stairway is first fire-proofed with porous terra-cotta tiles secured with screws and plates to the wooden carriages, and provision is made for expansion or contraction of the wood-work so as to provide against the possibility of the work cracking. The cement finish is applied to the tiles.



Fire Proof Construction With Iron Column and Girder, both Protected; and Wood Floor Joists, with Porous Tile Ceiling and Deafening.

Plaster Finish on Column, Girder, and Ceiling is here Shown.

This entire building, which is 150′ x 160′ on the ground and six stories high, is fire-proofed throughout with porous terra-cotta. The interior construction is with iron columns and iron girders, all of which are covered and plastered. The floors are of wooden

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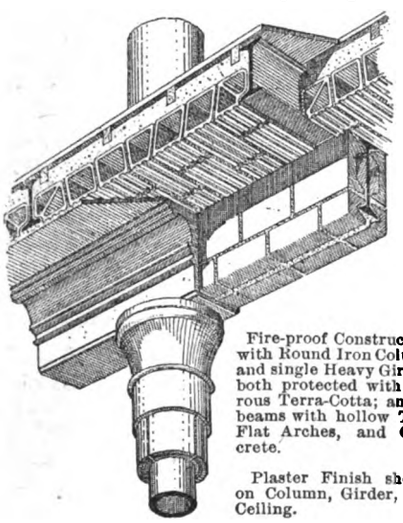
joists. The ceilings are of porous terra-cotta tiles screwed to the joists and plastered. The floors are double and fire-proofed between the two courses of floor-plank with 1¼″ of plaster. Our illustration on the first page shows the system of construction and fire-proofing.

It may be of interest to state that this building has cost only 18 per cent more than if it had been built in the usual non-fire-proof way. It is built to withstand any fire that may take place in its contents.

The Montauk Block in Chicago, a nine-story office-building owned by P. C. Brooks, Esq., of Boston, has been fire-proofed throughout by the Wight Company. It differs from the Ryerson Building from the fact that the floor-joists are of iron I-beams and the spaces between are bridged with hollow fire-clay flat tile arches.

The following illustration will show the system of construction and fire-proofing.

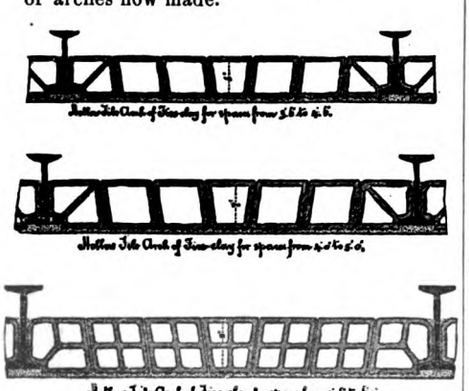


Fire-proof Construction with Round Iron Column and single Heavy Girder, both protected with Porous Terra-Cotta; and I-beams with hollow Tile, Flat Arches, and Concrete.

Plaster Finish shown on Column, Girder, and Ceiling.

This company manufactures and puts in hollow tile arches of fine quality and extraordinary strength, all made of the best Ohio River fire-clay. The material is such as to admit of the construction of lighter floor arches than have ever been made before. Their 6″ arches weigh 18 lbs. per foot; 7″, 24 lbs., and 8″, 30 lbs.

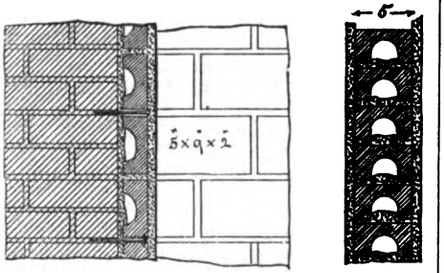
The following illustration shows the sizes of arches now made.



Work is contracted for in all parts of the United States.

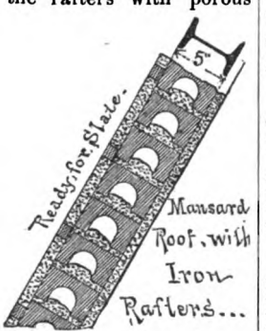
Partitions are built either of hollow fire-clay tiles similar to floor arches, or of Porous Fire-Brick. 4″ partitions weigh 15 lbs. per superficial foot if of hollow tiles and 20 lbs. if of porous fire-brick.

Walls are furred with hollow porous fire-brick. The following illustration shows sections of porous fire-brick furrings and partitions.

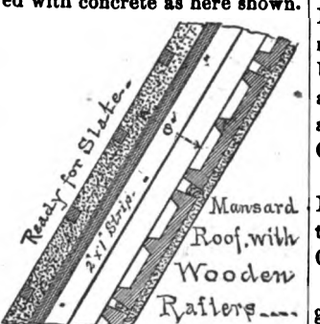


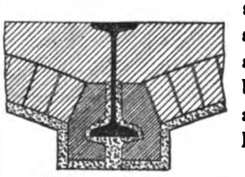
Porous Furring Bricks. Partition

Mansard roofs if built with iron rafters are filled in between the rafters with porous fire-bricks as here shown. If the mansard has wooden rafters they should be set twelve inches from centres, and covered on the inside with porous terra-cotta ceiling-tiles and a coat of plaster. The outside of such roofs may be covered with concrete as here shown.



When iron floor-beams are used and the appearance of arches in the ceiling is not objectionable, the best system of fire-proofing is to enclose the lower half of the beam with porous terra-cotta skew-backs, and to spring segmental arches of porous fire-brick between them, as shown on the following illustration.



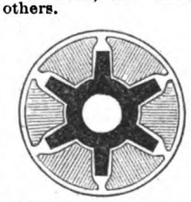


Skew Backs for Iron Beams.

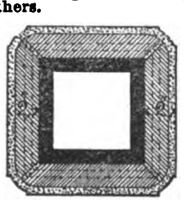
We give here sectional drawings of iron columns fire-proofed according to the Wight system.

The Standard Fire-Proof Column as used in Milwaukee Chamber of Commerce, Ryerson stores, Montauk Block, American Express stable, New York, Smith Building, New York, and many others.

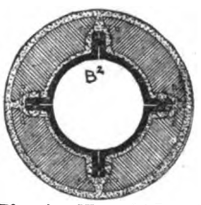
Round column as used by the Supervising Architect of the Treasury Department at Austin, Texas, Little Rock, Arkansas, and Utica, N. Y., also in Milwaukee Exposition Building, and many others.



Six Flange column as used in the First National Bank, Chicago, and Mitchell Building, Milwaukee.



Square column as used in Perkins' Building, Cleveland, and Grannis Block, Chicago.



Phœnix Wrought-Iron column as used in the Chamber of Commerce, Milwaukee.

Cruciform column suitable for church work. Many are used in upper stories for light loads.

In the American Express Company's Offices, Chicago, all the columns in the first story were fire-proofed two years ago. The new ones then introduced are of the same section as the first illustration. The old square iron columns were finished as round ones, and the old round ones were covered as they stood, thus making all the columns of uniform shape and finish.

Buildings completely fire-proofed by this company comprise the Art Department of the Milwaukee Exposition; the Montauk Block, and Ryerson's Block in Chicago; the Perkins Building at Cleveland, O., and the new Hammond Library, at Chicago, now in progress.

Fire-proofed columns are used in the Detroit Savings Bank, and store of Newcomb, Endicott & Co., Detroit; the Grannis Building, the American Express Building, the First National Bank, the Chicago Club-House, and numerous store buildings in Chicago; the United States Court-House and Post-Office, at Austin, Texas, Little Rock, Arkansas, and Utica, N. Y.; the Mitchell Building and Chamber of Commerce, Milwaukee.

Hollow-tile flat arches are also used in the Nixon Building, Chicago, the Watkins Institute, Nashville, and the Hammond Library, Chicago.

In most of the above buildings the iron girders are also fire-proofed with porous terra-cotta.

Architects in New York may examine the system of porous terra-cotta skew-backs with brick arches in combination with iron beams, also the covering of heavy girders and columns with porous terra-cotta and cement, in the new stable of the American Express Co., corner of Lexington Avenue and Forty-eighth Street, New York.

In all these buildings it is a recognized principle that *no building can be fire-proof unless all constructive iron-work is protected.* With these words as a motto the Wight Company has inaugurated a new era in the art of fire-proofing; having perfected systems for protecting the treacherous, though necessary, iron-work, wherever used for construction, and in such a manner as not to make it cumbersome and ugly. It has saved this useful material from the condemnation of those who have often decried its use because of its unreliability under great heat, without being able to suggest a practicable remedy. And in so doing it has perfected methods for artistically and substantially ornamenting interiors in a manner becoming such buildings.

The officers are H. B. Merrell, President; P. B. Wight, General Manager; Thomas Ferguson, Treasurer; F. R. Pettibone, Secretary. A. W. Hammett is Superintendent at Chicago, having immediate charge of the outside work, plastering and cementing.

The company has a branch office at 60 Williams St., New York, while the main office is at

73 Dearborn Street, Chicago, Ill.

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BUILDING MANILLA.

THIS Water-proof Manilla for covering outside and lining inside of buildings is one of the most important inventions in the paper line. It was patented by C. J. Fay, and is now owned by his successor, W. H. Fay.

Though properly termed paper, the manilla from which it is made is a product of the Philippine Islands, carefully selected and manipulated by a chemical process, which, while it is in nowise detrimental to health in its use for buildings, renders it obnoxious to insects and vermin, as well as makes it a water-proof material. This takes the place of more expensive materials for roofing; for outside walls of buildings; for walls and ceilings inside, in place of plaster; for lining under clapboards or weather-boarding, shingles, slates, etc.; for insulating buildings; for lining ice-houses and refrigerators, for covering trunks, counters, desks, etc. It is also made into carpets and rugs to take the place of oil-cloth.

Since the business was established sixteen years ago the material has been tested upon roofs, outside walls and inside walls and ceilings in place of plaster, and the result shows that there has never been introduced a material that takes its place for economy and comfort. For roofing or covering outside walls, this is without doubt the cheapest material in the market. Old shingle roofs may be covered with the roofing if the shingles are sound enough to hold the nails, and any ordinary workman can apply it after reading the printed instructions furnished. For the outside walls of buildings it is equally desirable as the cheapest lumber may be used. This material is used under weather-boards, shingles, slate, etc., for the purpose of excluding air and dampness. The use of the lining under weather-boarding, and the use on the wall and ceiling for inside in place of plaster, forms an air-tight space, — which Mr. J. Wilkinson, a practical architect of Brooklyn, N. Y., considers very indispensable in the construction of buildings. This invention is put to another use in the manufacture of manilla carpeting, and its manifold advantages are as follows: First, is its durability, a desideratum of every one who is aware of the yearly expenditure of carpets alone; and although the manilla carpeting has the same appearance (except a finer finish) as oil-cloth it is safe in making the assertion, that it will wear twice the time of any oil-cloth of the same price found in market. And the reason is that for oil-cloths a burlap (a kind of sleazy bagging) is first filled with a paint made of earth and fish oil, which forms the base for printing the colors upon; the oil never allows the filling to dry, hence the surface paint or colors are kept soft, and when in use easily peels off; while the surface paint on the manilla drys hard, the same as paint upon wood. Again, this carpeting does not expand to form wrinkles and wear off like oil-cloth, but lays down smooth to the floor, and having no paint on the back does not stick to the floor; it does not fray out at the edges, is easily kept clean, and, as it is secured to the floor with small tinned tacks, the carpet is easily removed. This carpet runs 36, 54, 72, and 90 inches in width, and the price for any of these widths is 40 cents per square yard. The factory is located at the corner of Front and Elm Streets, Camden, N. J., and the office and warehouse on Vine Street, below Second.

W. H. FAY, CAMDEN, N. J.

SPURR'S PAPERED VENEERS.

THE use of a veneer of thin wood of value glued to the surface of wood of lesser worth for the purpose of imparting a handsome finish to the work has long been known. Such veneer was, and indeed still is, cut about a thirtieth or a fortieth of an inch in thickness, but is never cut any thinner. Somewhere about the year 1868 it was discovered that it was possible to obtain a surface of wood so extremely thin that in some cases it would take 175 of the sheets piled upon each other to make an inch. This was thought to be an economical improvement at any rate, and the attempt was made to introduce these extremely thin sheets of veneer into general use. The attempt failed. The surface obtained was, indeed, marked and figured with all the beauties of the wood; it could be applied successfully to a surface, but it soon cracked and curled. Mr. Charles W. Spurr, however, found, upon experiment, that when this thin wood was expanded to its natural capacity and in that condition applied to a piece of paper, it ever afterwards remained in that condition, neither shrinking nor expanding after it had been applied as a veneer. This was the first idea, the details and the full development of which it has taken years to effect.

The logs, which embrace all the many kinds of rare and handsome woods, are halved or quartered and placed in a large tank, where they are steamed. This is for the purpose of expanding the water already contained in the sacs of the wood. The log is taken out in this moist condition and bolted upon a revolving section of a ponderous machine, which weighs over thirty tons, and which at every revolution throws off a thin board twelve feet long and from one-ninetieth to one hundred seventy-fifth of an inch in thickness. This machine is the only one of its kind in the world. The long knife which is used has to be the sharpest and truest possible. Any vibration would be fatal to the work. These delicate sheets of wood preserve the fibrous markings and tints. Different woods are cut of different thicknesses. The thinner the wood the smoother it is. Maple is cut 175 thicknesses to the inch; mahogany 125 thicknesses to the inch; birch 150 thicknesses to the inch; walnut and oak about 90. After cutting the wood is taken still wet, and applied to a sheet of paper. The paper is also wet at the time. After this papered veneer is dried it is a perfect compound and cannot be separated. Not only are logs used from which to cut these thin sheets of wood, but the unwieldy and shapeless burls, the warts as it were of the tree, are subjected to the same treatment. The peculiar marking and figures of wood cut from these burls make it particularly desirable for panelling, etc. After the wood is backed with the paper it is hung up and dried and is then ready for use. Such are the main features of the manufacture of the raw material. It now remains to speak of some of the uses to which it is put.

There are many uses to which the papered veneer can be put; but the most prominent of them all and that which may be expected to increase most in popular favor is the appliance of the veneer to the walls of rooms. It can be attached to the plastered wall, and after it has received the finish it can be washed whenever necessary. The beauty of the wood improves with age; it even strengthens the walls, while steam or furnace heat, dampness or frost have no effect upon it. There is no part of the room that is so much neglected, and which repays for furnishing more than the ceilings. Foreign artists understand this, and rich ceilings are generally found even when the walls are perfectly plain.

Obviously an invention which secures such advantages over the old veneer as this is peculiarly adapted to the manufacture of furniture. The New England Organ Company has used the veneer for seven years. It is used in various ways, and has entirely superseded the old veneers throughout the large establishment. The head of the firm is loud in its praise. He finds a saving of 30 per cent in the material for applying the papered over the old veneer, and a similar gain in labor. The veneer can be applied to any and all surfaces, to a square corner as well as anything else, and he has yet to find an instance where the work had failed to stand the test of wear. This can not be said of the old veneers formerly used, which cracked and peeled off after a time. The advantages which the veneers have been found to possess for this kind of work may be briefly summed up as follows: No waste or injury in storage or carless handling; many sheets can be cut at once, without ruining brittle wood; 100 pounds of glue will lay as much surface as 250 with ordinary veneers, twenty minutes under pressure, instead of twelve hours, keeping the press going all day; no delay for glue to set, but being immediately sand-papered, instead of planing, scraping, and sand-papering; less than one-half the amount of filling and finish, with marked clearness of color and brilliancy, and durability under circumstances fatal to the ordinary veneers and finish, from the absence of glue in the veneer or finish.

And, of course, what applies to the manufacture of organs applies equally to all kinds of furniture.

One of the most elegant uses to which papered veneer is put is the binding of expensive books, such as albums. Some of the sample books, bound in ash, French walnut and maple, highly polished, with or without steel engravings upon their surface are very taking. The report of the proceedings at the Garfield memorial services in Boston, were bound in this manner and sent to Mrs. Garfield and others. The same idea was embodied in the heliotype of the old elm on the Common and an autograph letter signed by Mayor Cobb. Mr. Spurr was made the custodian of the tree. A portion of the trunk was treated by his process, and, after subjecting it to the heliotype process, was framed. All the beauties of the wood were thus preserved, and will long remain a memento of the ancient tree, older than the city in which it grew.

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Another use to which the veneers are put is in the production of marquetries. The ordinary definition of this term means artificial and natural colors marked, sawed or cut in, the aid of hot sand and iron to shade, and dyes to produce the desired effect being resorted to. In Mr. Spurr's method the sawing or marking in of pieces is done away with, as these pieces are continually working up and off, a similar effect being accomplished by marking in different transparent colors on one whole piece of wood, dyeing the different parts, the whole making a flexible and durable veneer, which can be mailed or shipped. French-polished or varnished they withstand all our climatic changes. It is claimed by all who have used these marquetries and veneers that many days' time are saved by the use of these goods; time saved in laying in press, no time afterward needed for setting and hardening of glue before smoothing, and one-half the number of coats of shellac or varnish, means one-half the time saved.

Experiments are constantly being made to see what can be done with the veneer. It has lately been found that the wood can be stamped and handsomely embossed, and this discovery will lead to important results.

The business has grown up gradually and quietly, paying its way as it went, improvement after improvement being added to increase the perfection of the manufacture, till now not only the United States is supplied, but exports are made to all parts of the civilized world by

CHARLES W. SPURR,
35 Bedford St., Boston, Mass.

THE COMBINATION HOT-WATER AND HOT-AIR HEATING APPARATUS.

Now that indirect hot-water heating is generally admitted to be the most healthy and safe system for heating dwelling-houses, any improvement in that system will no doubt be appreciated by those acquainted with the subject of artificial heating. The objects of the combination are to economize in the use of fuel, and produce a pure, warm air uninjured by being overheated, and with the least expense. The cut below represents a hot-water boiler set inside of a thin wrought-iron hot-air radiator with a galvanized-iron casing outside of all. The front of the casings is cut away to show the boiler *A*, which is an upright tubular boiler in the form of a plain cylinder. *B* is a wrought-iron hot-air radiator riveted and calked air-tight with smoke-pipe *G* and *F* riveted to it and extending outside of the air space. *C* is a thin galvanized-iron casing outside of all.

The fire passes up through the tubes and returns down between the outside of boiler and wrought-iron hot-air radiator as shown by arrow points, and passes out through the smoke-pipe *F* to the chimney. *G* is a direct draught to be used when starting the fire.

The cold air is admitted at the bottom of the furnace, and passes up around the hot-air radiator absorbing the heat from the fire inside of the radiator *B*, thereby saving the heat which goes out and is wasted in the ordinary hot-water boiler.

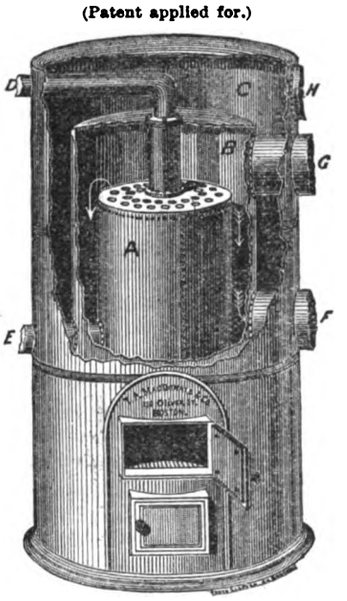
The warm air is conveyed from the hot-air chamber over the radiator *B* in tin tubes to the halls and rooms to be heated.

The hot-water circulates through the pipe *D* to the stacks of indirect radiators which may be placed anywhere in the basement convenient for heating the rooms above. After the water cools, it becomes heavier and gravitates to the lowest point which is the bottom of the boiler. This causes the circulation, *E* being the main return pipe.

The wrought-iron radiator *B* is made air-tight, where the pipes *D* and *E* pass through it by being placed between flanges in said pipes with asbestos packing on each side and bolted through all.

It will be seen that the object of economy in fuel is accomplished by absorbing nearly all the products of combustion, allowing as little heat to pass into the chimney as will serve to cause a draught. The fire-box is also constructed for thorough combustion, hot air being admitted over the fire. The tubes being smooth and upright will not clog up with soot and ashes, likewise the wrought-iron radiator, which is not the case with cast-iron surfaces. As to cheapness of construction: The boiler being in the form of a plain cylin-

(Patent applied for.)



der, is the cheapest as well as the strongest possible form in which a boiler can be made. The sheets come from the rolling mill the proper size for both the boiler and wrought-iron radiator, the riveting and calking being so simple is inexpensively done, and every square inch of both is exposed to the fire.

It will also be seen that as the boiler sets immediately over the fire, the water absorbs the intense heat, while it is only the milder gases which come in contact with the hot-air radiator *B*, and the air which is heated by it is not injured as it is in the ordinary hot-air furnaces, where the whole fire comes in contact with the radiator.

It must be remembered that the object of placing the wrought-iron radiator over the boiler is to absorb the heat from the fire which passes off and is wasted in other hot-water and steam boilers, for after the fire becomes reduced to a temperature equal to the steam or hot water inside the boiler it ceases to give off its heat, but by causing it to come in contact with a thin and sensitive radiator, surrounded with cold air, just before it passes to the chimney, this waste is saved in a very simple and practical manner, and the warm air produced by it is of a good quality.

We set these so that by drawing the water out of the radiators to a certain point in the boiler they can be used for low-pressure steam heating in extreme cold weather, the fire-box being large; the draught-door may be opened and a stronger fire used, which of course will be necessary when used for steam heating. A valve is put on each stack of radiators to check or shut off the circulation. Parties having their houses heated by wrought-iron furnaces have requested us to put a small boiler inside of them and a few hot-water radiators in rooms which they could not heat with hot air. This can be done at very little expense. The apparatus can be seen at

T. A. MacDONALD & CO.'S,
110 Oliver Street, Boston.

NOTES.

The bronze statue of "Endymion" lately erected at Greenmount Cemetery, Baltimore, over the grave of its sculptor, W. H. Rinehard, was cast at Philadelphia, by Messrs. Bureau Bros. & Heaton.

An architect who has probably profited by the advertisements of amateur photographic outfits in our columns, has discovered a new use for the pocket camera. Instead of sending us his original drawings that we might determine whether we wished to publish them in the *American Architect*, he has sent us photographic prints, and so has saved himself their possible loss and the cost of unnecessary expressage in case we should find they were not "suited to our needs."

The "Old Cape Cod Glass Works," of Sandwich, have been bought by Charles W. Spurr, of Boston. They have been idle since 1869, and will now be fitted up for making paper veneers.

Architects and builders will be interested in knowing that if they desire to use Peerless bricks in their buildings they must deal direct with the company itself, at 208 South Seventh Street, Philadelphia, as the company has no authorized agents in any part of the country.

The Fairhaven marble and marbleized slate company of Fairhaven, an old concern, have begun a suit against the Fairhaven slate company, a new corporation, claiming that the name of the latter company is calculated to deceive, and asking for an injunction for bidding its use.

The American Architect and Building News.

PUBLISHED EVERY SATURDAY BY

JAMES R. OSGOOD & COMPANY,

211 Tremont Street, Boston, Mass.

An illustrated Journal of Constructive and Decorative Art, devoted to the Interests of Architects, Builders, Decorators, etc.

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WARMING BY STEAM.

Of the means given us to supply artificial warmth to dwellings and all other buildings, none present so many points of excellence as that of steam.

The properly erected steam-heating apparatus of the present day has no superior in point of purity of temperature, economy in fuel used, simplicity in attendance, cleanliness in operation, and the ease with which a greater degree of heat can be equally maintained. Although the first cost of such an apparatus is greater than with other methods, and more so in proportion for a small than for a large building, yet a steam apparatus will pay for itself in time, certainly, in the increased comfort and health of the occupants of edifices so warmed.

Heating by steam is the same to-day as at its inception, thirty years since. In point of practical working, experience has taught better mechanical skill, and science has added improvements which render its control easier and adapt it more fully to the wants of consumers.

The great point of difficulty in erection of all steam-heating apparatus lies in the arrangement of returns or the placing of proper and ample means to remove the condensed water. Unfortunately the greater number of works in this line have been put up by unskilled workmen, the advance in the business having been so rapid as to preclude the proper education of many who have adopted the profession.

Particularly is unskilful work prolific of noise, and an abominable thing it is. Many times when retiring, and again at midnight, have most of us been annoyed by what can well be likened to a park of artillery let off at one's ear.

This more than anything else has served to bring steam-heating into disrepute, and caused many parties building to rely on older methods.

The best efforts of conscientious contractors have been directed of late to remove these obnoxious features, and to insure perfect circulation throughout all portions of any apparatus without appreciable pressure, and wholly free from noise.

Owners and constructors of buildings can not pay too much attention to the hygienic perfection of their edifices, and the best means of warming and ventilating should be adopted only after careful study and examination. Contractors only of known ability and experience should be employed; and again as to materials: if for use as low pressure, that they may be good and lasting, and if for high pressure that they be strong and carefully put together.

To any requiring work in this line we offer our services. Having an experience of twenty-five years, a large manufactory where almost everything required in steam engineering is manufactured under careful supervision and tested to a pressure of eighty pounds steam per square inch, and having a large force of skilled mechanics and engineers satisfaction is at once insured and fully guaranteed. As witness our work in New York at the New York Stock Exchange, Drexel, Morgan & Co., Mutual Life Insurance Co., and Herald Buildings, New Cathedral, and many other public and private constructions in all parts of the country.

Correspondence solicited by

GILLIS & GEOGHEGAN,
Heating and Ventilating Engineers,
116 and 118 Wooster St., New York.

ENCAUSTIC TILES.

The presentation of the case of the Indianapolis Encaustic Tile Works before the members of the United States Tariff commission lately is a matter of more than local interest, for the reason that the special line of industry which this company has introduced to the United States is one that the people may well regard with more than usual consideration. Indianapolis is the only city on this side of the Atlantic which manufactures encaustic tiles in patterns, styles and quality that rival, and frequently excel, the famous Minton tiles of England, rendering importation of the foreign production no longer necessary. For this reason the members of the Commission were ready to give marked attention to the facts and arguments presented to them, and, after inspecting choice specimens of the artistic production of the tile works, they were probably convinced that the industry was one of sufficient national importance and promise to deserve whatever aid in its development might be possible through the aid of protective tariff duties.

The company was represented by Hon. Addison C. Harris, who addressed the Commission in explanation of the history of the manufacture of encaustic tiles in England and the United States. The Minton works in England had, he said, been in operation since 1840, and the production of encaustic tiles, by a similar process, was commenced in this country, at Indianapolis, in 1877. Up to that time, all the tiles used in this country had necessarily been imported, and their price which had, of course, been controlled entirely by the foreign manufacturers, was so high that they could not be obtained for the general use which was desirable. As an illustration of the great expense at which the imported tiles were procured before the Indianapolis Encaustic Tile Company commenced operations, he stated that the tile flooring of the Indianapolis post-office, laid about eight years ago, cost the Government $1.25 per foot, while a similar and better tile could now be supplied from the works of this city at forty cents per foot. In view of the fact that the use of tiles in public and private buildings deserved encouragement, both upon artistic and practical grounds it was, therefore, evidently a public advantage to have the home manufacture encouraged and developed. This he said could only be done by a continuance of the present tariff duties, for, although the Indianapolis company was gradually establishing itself, and would in a few years be second in capacity to no other encaustic-tile factory in the world, it would be unable to successfully compete with the wealthy and old-established foreign producers, who, if the tariff duties were not maintained, could easily, with the difference in the cost of labor, undersell to such an extent as to ruin the American industry, and make their profits subsequently by the high rates that could be charged when competition was at an end.

Mr. Harris, at the conclusion of his address, introduced to the Commission Mr. Robert Minton Taylor, superintendent of manufacture of the Encaustic Tile Company, and a nephew of the celebrated Herbert Minton, who was the originator of the manufacture of encaustic tiles in England. Mr. Taylor, who has been engaged in tile manufacture since 1859, described somewhat in detail the efforts of his uncle, in association with the well-known English architect, Welby Pugin, for the restoration of the lost art of reproducing fac-similes of the rare mediæval designs upon the tiles found in the old churches and cathedrals of Europe. He also gave some details of the modern methods and processes entering into the manufacture of these tiles, and said that the location of the encaustic-tile factory at Indianapolis had been largely on account of the fact that the clays of Indiana, easily accessible from this point, were superior to any that could be found elsewhere—better in reality than those which had been used in similar manufactures in England. For this reason some of the work produced here had been better than the English tiles. Their production in this country was, however, attended by much greater expense. Three-fourths of the work is done by hand, and much of it by skilled labor. He believed the wages here were from 50 to 75 per cent more than for the same class of labor in England. Besides this, the cost of clay was greater. It would, therefore, he said, be impossible to compete with the foreign producers if the tariff duties were removed, and he asked that the present duties—20 per cent ad valorem on the common tiles, and 35 per cent on the better class of goods—be retained.

Mr. W. W. Lyon, secretary of the Tile Works Company, was also presented as a witness, and said that the present rate of duty was satisfactory, although if there was to be any change it should be in the nature of an increase, as the development of the home industry would not only lead to the employment of a large number of persons, many of them women, but would also keep down the price of encaustic tiles more effectually than could be done by allowing the foreign producers to monopolize the markets of the world, as they did before the Indianapolis company was started. Mr. Lyon replied to a number of questions put by members of the Commission, and showed that although the manufacture of encaustic tiles was only commenced here about five years ago, the American product was being used extensively for flooring and panelling in Government offices, banks, and public and private buildings of all descriptions throughout the country, their beauty and utility being everywhere acknowledged. Orders may be addressed to

THE UNITED STATES ENCAUSTIC TILE CO.
Indianapolis, Ind.

A RAIN-WATER CUT-OFF.

In these days of sanitary investigation the first thought of every householder is, Is my water-supply all right? and if he acts upon his thought he too often finds that it is all wrong, especially if he lives in the country and depends on a well. Evidently to dig another well is but a doubtful cure of the

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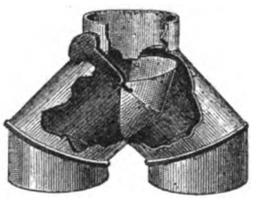
existing evil, and he naturally considers the matter of collecting and storing the rain-water falling upon his own roof. If he has had any experience with cisterns he knows they are troublesome things, either too large or too small, sometimes tight, oftener leaky; demanding regular and periodic cleansing, but rarely getting it, and therefore being a standing threat against the health of the household, and a constant cause of expense because of the necessity of renewing the filter-wall which has become inoperative by being clogged with the impurities washed down from the roof. But in spite of all these ob-



jections rain-water if properly collected affords the safest, most refreshing and satisfactory water-supply, and it is a very simple matter to collect it properly. In the first place the gutters should be kept clean of all decaying vegetable matter by frequent cleaning, and the opening from the gutters into the conductors should be protected by raised galvanized-wire cages, and next, some means should be provided by which the first rain which falls on a roof — it may be after weeks of dry and dusty weather which has covered the slates or shingles with every conceivable kind of mineral and vegetable dust — is made to discharge elsewhere than into the cistern. This can be effectually accomplished by fixing at a convenient point in each down-spout connected with the cistern a Howell Patent Cut-off, of which the construction and manner of working is clearly shown in the annexed cut. The damper should always be turned so that the rain-water may run to waste, and it should only be turned so as to discharge into the cistern if the shower is a heavy one, and then only after the rain has fallen heavily for some five or ten minutes and it is certain that the impurities have been thoroughly washed from the roof. If after this has happened the dampers are reversed the householder may rest assured that he is collecting the purest and safest water for family use.

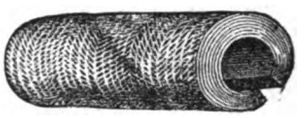
These cut-offs are made by

HOWELL & CLENDENNING,

638 Madison Street, Covington, Ky.

INSULATED AIR-COVERING.

"Bradley's Insulated Air-Covering" for boilers, pipes, etc., to prevent the condensation of steam, and the contents of gas and water pipes from freezing has come into general use in Chicago and the West. It is made of asbestos and wool gellings, and is manufactured on an entirely new principle. Cellular or intersticial spaces are incorporated in the



fabric in process of construction, thereby forming an *insulated air-covering* unequalled for non-conducting qualities, lightness and durability. This covering is made in sections 3 feet long, ¾ inch in thickness, and weighs about 1 lb. per square foot finished surface.

It is elastic, will not crack or crumble, and is not affected by contraction or expansion of heated surfaces. It is simple in its application, and can be applied by any workman.

Manufactured and sold by the

BRADLEY MANUFACTURING CO.,

Chicago, Ill.

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To the many persons who apply to us to sell them the illustrations only of the *American Architect and Building News* in the hope that they can obtain them at a reduced rate, we always reply that the text and the illustrations of our journal are inseparable.

Such persons, and others who desire to obtain a valuable collection of architectural designs cheap, have now an opportunity to do so, for having made up as many complete volumes and sets as possible, we are willing, for the sake of making space in our stock-room, to sell off incomplete volumes at

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1878	4 "	48 "	192	4.50
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In order that architects and others may appreciate the reduction that we make on these incomplete and, of course, unbound volumes, we append our present scale of rates, premising that our *regular* rate is $7.50 for unbound and $9.00 for bound yearly volumes: —

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1878*	9.00	10.50	1881	7.50	9.00

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Single Copies, 15 cents. Single Copies with Gelatine Plate, 20 cents.

Any one who wishes to procure a *complete* set, bound or unbound, of *The American Architect and Building News* is hereby advised that at the present date (October 1, 1882) we can supply only five complete sets of bound volumes and seven complete sets of unbound volumes.

JAMES R. OSGOOD & COMPANY, Publishers, 211 Tremont Street, Boston, Mass.

PROPOSALS.

(*Continued from page x.*)

HARDWARE AND GLASS.
[At New York, N. Y.]

Office of Supervising Architect,
Treasury Department,
Washington, D. C., September 30, 1882.

Sealed proposals will be received at this office until 12 M., on the 18th day of October, 1882, for furnishing and delivering at the Treasury Building, Washington, D. C., all the hardware required for the Barge Office at New York, N. Y., in accordance with specification and schedule. Also, for furnishing and delivering (at the Barge Office at New York, N. Y.) all the plate double thick sheet and cathedral glass required for that building, in accordance with specification, schedule and diagrams. Copies of the specifications, schedules, and diagrams, and any additional information, may be had on application at this office or the office of the Superintendent.

JAMES G. HILL,
825 Supervising Architect.

PROPOSALS.

STEAM-ENGINE. [At Albany, N. Y.]

Office of the Superintendent,
Albany, N. Y., September 14, 1882.

Sealed proposals will be received at this office (where proposal blanks can be procured) until 12 o'clock, noon, Friday, October 13, 1882, for furnishing and putting up a steam-engine for use in this building. It must be equal in durability, economy and all other respects to the Buckeye engine. Bidders will give their prices for both a 300 and a 500 horse-power engine. The bids must be accompanied with full detailed specifications of the engines which are proposed to be furnished, and of what they will be guaranteed to accomplish. The engine must be furnished and put up where directed by the Superintendent on or before December 15th, 1882.

Each bid must be enclosed in an envelope addressed to the undersigned, indorsed "Proposal for Engine," and must be accompanied by bonds of two sureties, residents of the State of New York, each to the amount of $5,000. Said sureties are to guarantee that the bidders will execute a contract, if it is awarded to them, and will perform the same faithfully. The right is reserved for the Superintendent, with the concurrence of the New Capitol Commission, to reject any or all bids, and after a contract is entered into, to declare said contract forfeited whenever, in their judgment, it is not being performed for the interest of the State.

JAMES W. EATON,
354 Superintendent of New Capitol.

PROPOSALS.

LOW-PRESSURE STEAM-HEATING APPARATUS. [At Philadelphia, Pa.]

Office of the Supervising Architect,
U. S. Treasury Department,
Washington, D. C., September 28th, 1882.

Sealed proposals will be received at this office until 12 M., on the 18th day of October, 1882, for the Low-Pressure Steam-Heating and Ventilating Apparatus, Tanks, etc., for the Court-House and Post-Office Building at Philadelphia, Pa., in accordance with the Drawings, Specification and Schedule.

Copies of Specification and Schedule may be obtained from, and drawings may be seen at this office, or the office of the Superintendent.

355 JAS. G. HILL, Supervising Architect.

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TREATING ON ALL QUESTIONS OF INTEREST TO THE BUILDING TRADES.

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And a large number of other articles on practical questions, such as "DAMPNESS IN CELLAR-WALLS," "HOW TIMBER SHOULD BE SAWED," BOOK REVIEWS, &c., besides the PRICES CURRENT OF BUILDING MATERIALS.

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PROPOSALS.

INSANE ASYLUM.
[At Traverse City, Mich.]

Sealed proposals, in duplicate, will be received at Traverse City, Michigan, by the Board of Commissioners, until 10 A. M., of Wednesday, October 25th, 1882, at which place and time the proposals will be opened for the general construction of the Northern Asylum for the Insane, located at Traverse City, Michigan, in accordance with plans and specifications prepared by Gordon W. Lloyd, and adopted by the Board.

The plans and specifications can be examined at the office of the Board, in Traverse City, Michigan, on and after September 6th, 1882.

For further information address

355 C. M. WELLS, Superintendent.

By direction of the Board of Commissioners.

IRON RAILING AND FLOOR LIGHTS.
[At Philadelphia, Pa.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., September 22, 1882.

Sealed proposals will be received at this office until 12 M., on the 12th day of October, 1882, for furnishing and fixing in place the Iron Railing for Approaches and the floor lights for first-story floor of the Post-Office and Court-House at Philadelphia, Pa., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,
354 Supervising Architect.

YELLOW-PINE LUMBER, ETC.
[Near Lewes, Del.]

U. S. ENGINEER OFFICE, 1125 Girard Street,
PHILADELPHIA, PA., September 12, 1882.

Sealed proposals, in triplicate, will be received at this office until 12 M., of Thursday, October 12, 1882, and opened immediately thereafter, for

Furnishing 91,380 feet B. M. of first-class Southern yellow-pine lumber, and appurtenances for a first-class railroad track, 2,810 feet long, including two switches, the material to be delivered at the U. S. Pier Delaware Breakwater Harbor.

The pier is to be of stone, with either crib or pile foundation, as may be most advantageous.

For forms of proposals and all information apply at this office.

G. WEITZEL,
354 Lt.-Col. of Engineers, U. S. A.

PROPOSALS.

BRIDGE.
[At Covington, Ky.]
August 15, 1882.

The City of Covington, Ky., through its Board of Bridge Commissioners, solicits proposals for building a bridge across the Ohio River at Covington, under the provisions of an act of the General Assembly of Kentucky, approved 1st March, 1873, which will be received until 12 o'clock, noon, the 15th of October next.

Apply to J. D. Hearne, President of the Board of Commissioners, at Third National Bank, Cincinnati, for particulars.

J. D. HEARNE,
J. O'HARA,
Committee.

354 W. H. MACKOY, W. W. CLEARY, Attorneys.

LUMBER, ETC.
[At Philadelphia, Pa.]

PHILADELPHIA, PA., September 27, 1882.

Sealed proposals, in triplicate, will be received at this office until 12 M., of Wednesday, October 25, 1882, and opened immediately thereafter, for material to be used in the construction of the Delaware Breakwater Harbor, as follows:

123,278 feet B. M. yellow pine or white oak; 19,102 pounds wrought-iron bolts, nuts and washers; 4,300 pounds spikes and nails; 40 tons railroad iron, 30 pounds per yard; 1,200 oak railroad ties; 264 spruce or pine piles, creosoted; 15,000 cubic yards brush; 16,225 tons granite.

Bids received for any or all classes of material.

For forms, specifications, etc., apply at this office.

G. WEITZEL,
356 Lt.-Col. of Eng'rs, U. S. A.

JOINERS WORK AND WOOD FLOORING.
[At Philadelphia, Pa.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D.C., September 26th, 1882.

Sealed proposals will be received at this office until 12 M., on the 13th day of October, 1882, for furnishing and fixing in place complete all the Joiners Work and Wood Flooring required for the Court-House and Post-Office Building at Philadelphia, Pa., in accordance with the drawings, specification and schedule, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

JAS. G. HILL,
354 Supervising Architect.

PROPOSALS.

BRICKS.
[At Cincinnati, O.]

The Cincinnati Gas-Light and Coke Company will receive tenders up to noon Saturday, October 14, 1882, for five million bricks, to be delivered at "East End Garden," situated between Eastern Avenue and Ohio River, and Main and Spencer Streets, First Ward, Cincinnati.

One million to be delivered between January 1 and March 1, 1883.

Two million to be delivered between March 1 and May 1, 1883.

Two Million to be delivered between May 1 and July 1, 1883.

Each bid to be accompanied by specimens of the bricks to be furnished, which specimens are to be made the standard to which deliveries must conform, in accordance with the provisions of the specifications on file at Gas office, corner Fourth and Plum Streets.

A good and sufficient bond in the sum of $10,000 will be required, conditioned upon the faithful performance of the contracts.

Bids will be received for the whole lot, and also for separate deliveries.

The Company reserves the right to reject any and all bids. 354

STEEL WIRE.
[At Boston, Mass.]

NAVY PAY OFFICE, 45 MILK ST.,
BOSTON, September 29, 1882.

Proposals, sealed and indorsed "Proposals for Steel Wire," will be received at this office until October 11, 1882, at 12 o'clock, M., to be opened immediately thereafter in presence of bidders, for furnishing and delivering at the navy-yard, Boston, 13,500 pounds No. 8 galvanized steel wire, diameter .175, breaking strain each wire 3,800 pounds, to stand the usual tests at the United States ropewalk of wire for like purpose; to be in one continuous length of not less than 30 pounds; to be delivered at the Boston Navy Yard within thirty days; the price bid to include delivery. Two satisfactory sureties must accompany the bid, guaranteeing a faithful execution of the offer, if accepted. The right is reserved to reject any and all bids not considered advantageous to the Government. Blank forms for proposals will be furnished by this office.

354 G. E. THORNTON, Pay Director, U. S. N.

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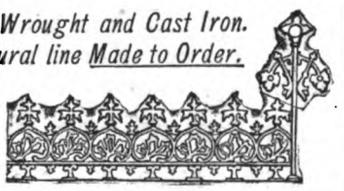

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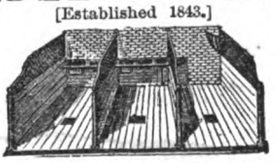

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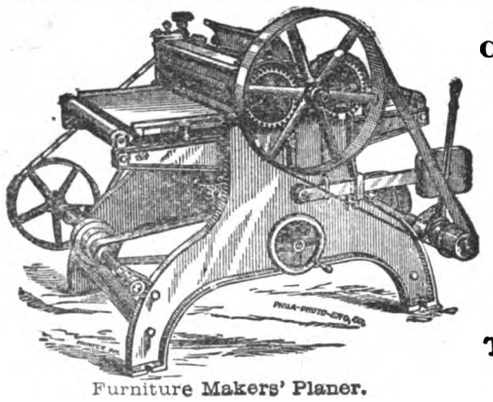

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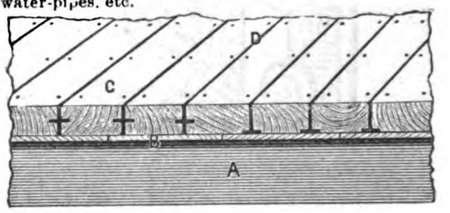

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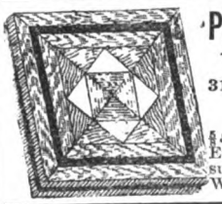

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